Alberta

Research Capacity Impacts

Advanced Education and Technology

2009 Annual Report

2009 Annual Report

Research Capacity Planning
Alberta Advanced Education & Technology
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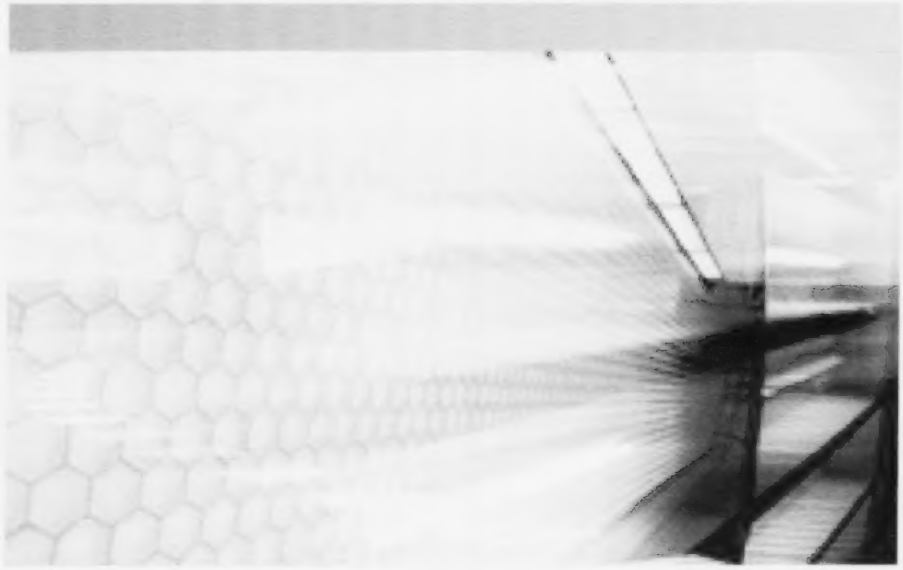


Research Capacity Impacts

The Department of Advanced Education and Technology (AET) manages and funds investments in science and research that support the development of innovation in Alberta. The goal is to strengthen the province's innovation capacity by making research infrastructure investments at Alberta's research intensive post-secondary institutions.

These research equipment investments ensure that Alberta's researchers acquire cutting-edge tools to conduct innovative science, which in turn accelerates the development and commercialization of ideas that impact the Alberta economy.

Advanced Education and Technology, through its research capacity building programs, also supports the retention, recruitment, and development of the brightest innovators and scientists by providing them with the funding, expertise, recognition and facilities they need to succeed.

In January, 2010, the Alberta Innovates Corporations came into being.

Alberta Innovates is the name of Alberta's newly realigned research and innovation system designed to strengthen the province's role as a world leader in using science to seek solutions.

AET will work with the Corporations to enhance innovation and to build research capacity in our strategic priority areas.

The four new corporations are:

Alberta Innovates Bio Solutions

Alberta Innovates Energy and Environment Solutions

Alberta Innovates Health Solutions

Alberta Innovates Technology Futures

The Alberta Science and Research Investments Program (ASRIP) and the Small Equipment Grants Program (SEGP), the province's two main research capacity funding programs, also serve as important mechanisms for leveraging funds from the federal Canada Foundation for Innovation (CFI), the private sector and other sources to maximize the research dollars flowing into Alberta's research priority areas.

Strategic Research Priorities

AET supports research in the following targeted research areas:

Information and Communication Technology (ICT) Research - As the foundation for telecommunications, electronics, computing, medicine, advanced materials and manufacturing industries, ICT is one of the world's strongest, fastest growing economic sectors.

Since 2000, AET has invested in 303 research capacity building projects

Nanotechnology Research - Nanotechnology research explores the unique properties of biological structures and engineered materials at an atomic and molecular scale to find out how changing their structure, size or chemical composition creates an improved or beneficial application. Through the convergence with ICT, biotechnology and other technologies, it has the potential to create entirely new industries.

Energy Research - Energy related research addresses the technical, economic, and environmental challenges faced by Alberta's energy industry. Energy research can improve the efficiency of energy extraction, reduce the industry's environmental impact and explore new and emerging energy sources for Alberta.

Life Sciences Research - Life sciences is a significant element of the Alberta economy. Life sciences research aims to create added value to Alberta's traditional economic strengths in agriculture, agrifood and forestry, while safeguarding the environment. Life sciences investments also support the broad range of Alberta's medical research capacity.

Other/Multidisciplinary Technologies Research

The Alberta government makes strategic investments outside the four targeted research areas to enhance the province's position in the knowledge-intensive economy, and to make the province increasingly competitive in global markets. These other/multidisciplinary investments include climate change, engineering, chemistry and economics research.

Cumulative Results

Since its inception in 2000, AET's research capacity programs have invested more than $206 million and leveraged $700 million more in other funding to support innovation in Alberta (Figure 1). As a catalyst for innovation, our leveraging ratio currently stands at 3.5:1.

As of January 1, 2010, AET has invested in 303 research projects through the Alberta Science and Research Investments Program (ASRIP) and the Small Equipment Grants Program (SEGP). The SEGP funding has helped to bring and/or retain approximately 200 new research professors to the province. By attracting and retaining talented people with equipment and facilities, the funding programs are creating a climate that builds synergy and collaborations among our leading researchers and provides state-of-the-art training opportunities for graduate students - the next generation of high quality innovators.

Approximately 200 new research professors have been recruited to Alberta

Since 2000, the ASRIP and SEGP have invested in three targeted research areas: Life Sciences ($111.9 million), Information and Communications Technology ($12.7 million), and Energy ($23.4 million), while supporting multi-disciplinary projects that cross these areas of priority ($58.3 million). Multi-disciplinary projects have impacted climate change/environment, nanotechnology, engineering and social sciences (Figure 2).

A complete listing of the ASRIP and SEGP infrastructure projects funded from 2000 to 2009 is detailed on pages 18 to 86.

Initiatives supported by AET's research capacity investments have gained national and international recognition and contributed to treatments and diagnoses for improved health outcomes, new ICT breakthroughs, efficiencies in the energy sector and many other discoveries too numerous to mention.

This report focuses on selected research highlights and selected projects in the field of health on pages 5 to 17.

MORE
Information

For more Information on building research capacity in Alberta, please visit the AET website at: http://aet.alberta.ca/

Figure 1

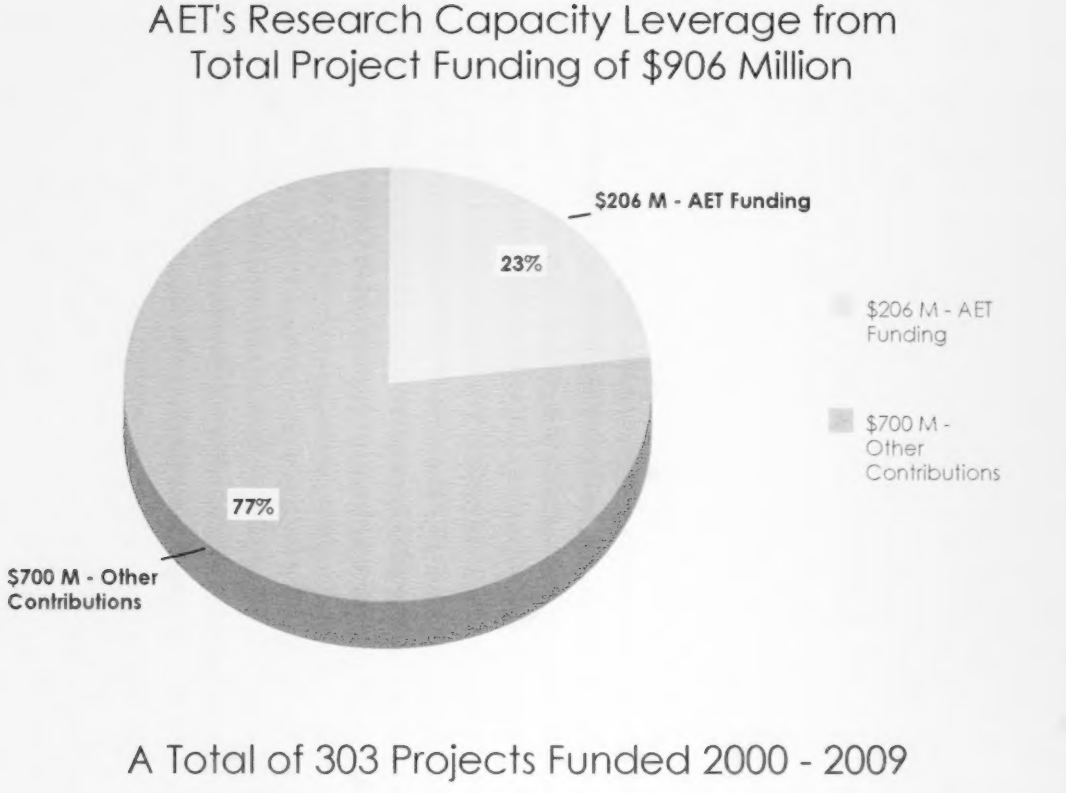
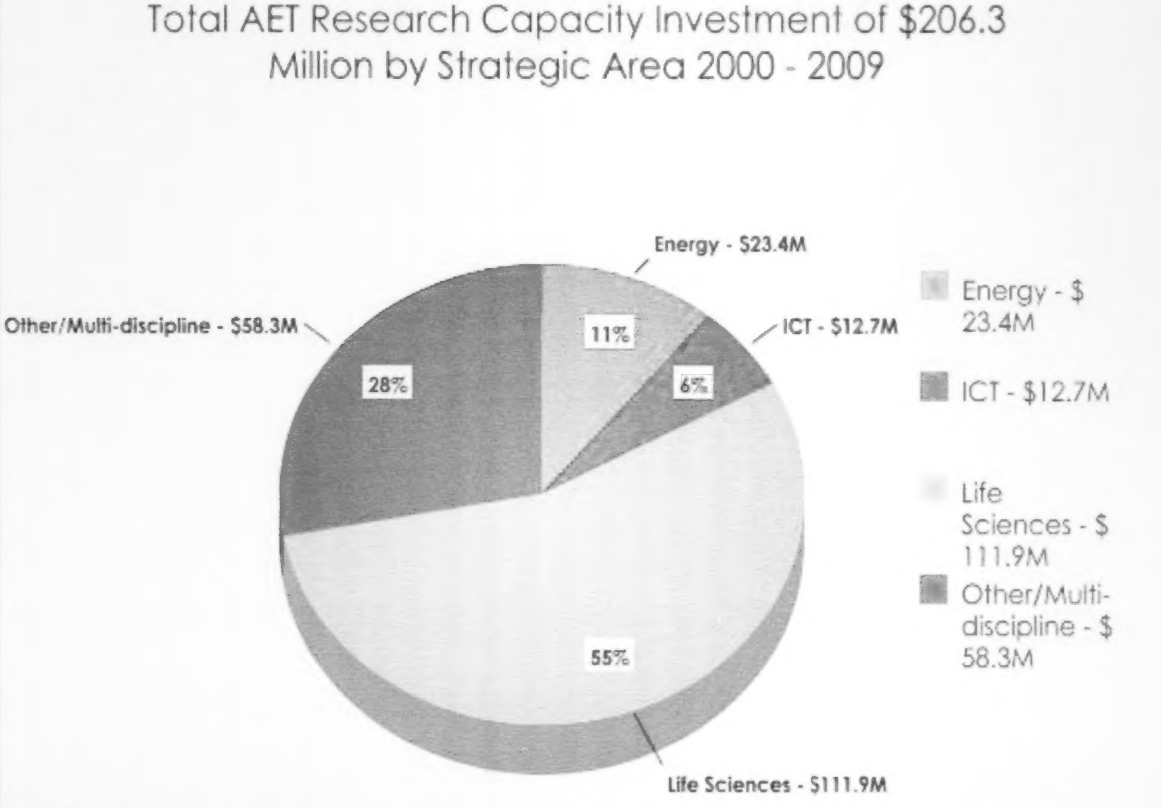

AET's Research Capacity Leverage from Total Project Funding of $906 Million
$206 M - AET Funding
23%
77%
$700 M - Other Contributions
$206 M - AET Funding
$700 M - Other Contributions
A Total of 303 Projects Funded 2000 - 2009

Figure 2



Selected Research Capacity Investment Highlights

The Canadian Centre for Behavioural Neuroscience (CCBN): A Success Story Built on Vision and Excellence

The success of the CCBN is attributable to a strategic vision that recognized research excellence and realized opportunities to build neuroscience capacity at the University of Lethbridge.

By the end of the 1990's, the University of Lethbridge's stellar reputation in behavioural neuroscience was well established. A comprehensive textbook on human neuropsychology, written by Drs. Ian Whishaw and Bryan Kolb of the U of L, had made a seminal contribution to the field, and it continues to be widely used in undergraduate courses in numerous institutions. Drs. Whishaw, Kolb and others were demonstrating excellence through their research and teaching, and the University of Lethbridge's MSc program in neuroscience was celebrating nearly a decade of success.

As the new century dawned, it was clear that the University of Lethbridge was well positioned to build on this success. By choosing a strategy to focus on key areas of strength, including neuroscience, the University of Lethbridge effectively created an international reputation for innovative research in behavioural neuroscience.

Creating Capacity

Once the strategy was put into effect, it became the basis for a series of capacity building successes. The University of Lethbridge recognized that a key first step was to establish physical space to bring together the existing neuroscience team and equip them with cutting-edge facilities. This step would prove to be a catalyst for recruiting new talent and creating new capacity.

Thanks to the strategy built on excellence, the University of Lethbridge garnered support from the Government of Alberta (GOA) and other partners to establish the Canadian Centre for Behavioural Neuroscience (CCBN) in 2001. This 60,000 sq. ft. space houses state-of-the-art research laboratories and offers contiguous space for researchers, students, technicians and visiting scientists. The facility also houses a private neuroscience research company, NeuroInvestigations, Inc. At the same time, the university welcomed its very first class of PhD students who were able to start their program with the benefit of the CCBN's state-of-the-art infrastructure.

Expanding Capacity

As the CCBN's research activity expanded, it was important to support its scientists with the latest technologies to carry-out transformative behavioural neuroscience research. The University of Lethbridge's proven strategy of focus met this need by acquiring related equipment awards in the early 2000s via the Alberta Science and

More function, more results

Cutting-edge imaging systems are imperative to the success of CCBN scientists. The ASRIP supported the retrofit of two existing magnetic resonance imagers (MRIs), an associated helium recovery system, and additional equipment to broaden their functionality. With these improvements, CCBN scientists could run parallel studies between human and animal MRIs, an approach that strengthened and accelerated discoveries in behavioural neuroscience.

Attraction to Lethbridge

Dr. Bruce McNaughton is an AHFMR Polaris Investigator, recruited to the University of Lethbridge in 2008. His groundbreaking research relates to how the human brain stores, processes and transmits information. The Polaris Award was established by AHFMR as a means to help Alberta universities recruit outstanding mid-career health researchers of exceptional international calibre to the province. The goal of this award is to accelerate research activity in key areas that are priorities for Albertans.

Research Investments Program (ASRIP), the Canada Foundation for Innovation (CFI) and other sources. Thus, subsequent to establishing the core CCBN facility, the University of Lethbridge brought in critical equipment, including a 500 MHz Nuclear Magnetic Resonance installation and related equipment to broaden the CCBN's functionality. They also obtained key resources to expand the CCBN in 2004, which allowed researchers to take full advantage of CCBN equipment and collaborations by bringing together researchers from complementary fields. These researchers worked together to build on the multidisciplinary synergies that were emerging from bringing top talent together in common space. CCBN scientists could now run parallel studies with human and animal MRIs, an approach that strengthened and accelerated discoveries in behavioural neuroscience.

The stage was set for continued capacity building and increased excellence. The next section elaborates on the very real impacts made through the successful strategy to focus on neuroscience and build a true center of excellence. The University of Lethbridge's most recent infrastructure award is the culmination of this strategy – the award is enabling the multidisciplinary CCBN team to grow and to blaze trails into the next frontier of common interest and promising directions.

International interest and increasing investments

The international recognition of excellence in behavioural neuroscience, catalyzed by CCBN infrastructure, served to garner integral operating support. The distinct but complementary areas of research interest at the CCBN include the neural mechanisms of learning, brain plasticity, recovery of function, brain development and brain disease. These research areas have enabled CCBN scientists to attract funding from a variety of granting agencies, including the National Institutes of Health (US), the Heart and Stroke Foundation, the Natural Sciences and Engineering Research Council (NSERC), the Canadian Institutes for Health Research (CIHR), the Alberta Heritage Foundation for Medical Research (AHFMR), Alberta Ingenuity, and iCORE. The success in attracting research funding by CCBN scientists has made a significant contribution to the university-wide increase in research revenue, from $9.8 million in 2003-04 to $15.9 million in 2008-09, reflecting the increasing capacity and quality of research that is happening at the University of Lethbridge.

Teaching and training at the forefront of knowledge

Teaching and training are vital to the ongoing success and international recognition of the research programs at the CCBN. The increase in the number of students studying neuroscience shows the growing interest for training under the

leadership of internationally-recognized behavioural neuroscientists. In 1997-98, before the inception of the CCBN, the University of Lethbridge had 33 undergraduate students and 1 MSc student enrolled in its Neuroscience program. By 2008-09, the CCBN was home for 111 undergraduate students and 30 graduate trainees, a mix of MSc, PhD, and post-doctoral fellows. Graduate students benefit from the latest training techniques to transition into careers in commercial biotechnology and pharmaceutical research, or to continue their training in highly-productive laboratories around the world. Indeed, some of the University of Lethbridge's former trainees, including Drs. Robbin Gibb, Robert Sutherland, and most recently, Andrew Iwaniuk have returned to the CCBN as faculty members after receiving further training from top research labs around the world—a testament to how leading-edge facilities develop and attract talent.

CCBN and the larger community

Community engagement and outreach are important components of CCBN programs. The University of Lethbridge hosts an annual Brain Awareness Week, which brings research activity at the CCBN out to the local community. For example, in 2010 the agenda included a free public lecture entitled "A User Manual for The Brain" by Dr. Robert Sutherland. An open house of the CCBN hosted a Brain Awareness Fair featuring displays from community groups such as the Parkinson Society of Southern Alberta, the Alberta Brain Injury Network, and the MS Society of Canada. The CCBN researchers also work with primary health care providers in the community to translate their research findings into better diagnoses and treatments of brain-related disorders.

The Next Frontier

The University of Lethbridge is building on the strength of the CCBN by expanding its programs into new frontiers of research, exploring innovative interdisciplinary collaborations, and applying the cutting-edge research approaches developed at the CCBN to be translated and applied by plant scientists, toxicologists and cancer researchers.

These collaborative researchers have been brought together by the emergent field of epigenetics. This exciting new field examines changes which occur in gene expression and phenotype that are not related to changes in the DNA sequence. The changes are modifications to the actual DNA building blocks (i.e., DNA methylation), or changes to the structures surrounding the DNA or other non-genetic factors. The University of Lethbridge scientists are looking beyond the boundaries of their disciplines to better understand how epigenetics may be inherited, or even reversed. One focus of the research on epigenetics is to understand the impact of epigenetic factors on fetal alcohol spectrum disorder (FASD), which is the central theme of Dr. Robert Sutherland's research. Unravelling

Cross-discipline collaboration

The University of Lethbridge was awarded $2,816,548 for the ASRIP project entitled "Southern Alberta Group for Epigenetic Studies – Epigenetic Regulation of Cell Memory and Stress Responses (SAGES)", led by CCBN researcher, Dr. Robert Sutherland. This award will bring together researchers in the institution's areas of strength (neuroscience and molecular biology) to lead in this emerging area of research. The project will enable scientists to make major new discoveries related to improved understanding and treatment of human disease (e.g., cancer, Parkinson's Alzheimer's), new biofuel models, and environmental toxicology, to name a few.

the connection between fetal alcohol exposure and epigenetics is a stepping stone for the discovery of better treatment. The excellence at the CCBN was the basis for a new investment by the ASRIP and the CFI to support the SAGES project, which will be the foundation for the exploration of the field of epigenetics at the University of Lethbridge.

Capacity for the Future

The CCBN's future prospects are promising, thanks to the University of Lethbridge's sustained strategic vision and research excellence. Locally, Drs. Sutherland and Kolb are working with the Blood Tribe and health care practitioners. Lethbridge will also be connected to researchers based at different institutions in Canada, as well as with scientists in Norway and the USA.

The recruitment of Dr. McNaughton with the research support provided through the Polaris Award is an integral addition to the CCBN's research capacity and networks. Bolstered by the recruitment of Dr. McNaughton, the University of Lethbridge's recruitment efforts have been effective, as illustrated by the recruitment of five new Assistant Professors (Drs. Andrew Iwaniuk, Masami Tatsuno, Aaron Gruber, David Euston and Artur Luczak) – all trainees of leading laboratories in neuroscience. Dr. Andrew Iwaniuk completed his MSc training at the CCBN, went on to Australia and Washington D.C. to get his PhD and postdoctoral experience, and has since rejoined the team, armed with awards from Alberta Ingenuity and NSERC. Two other recruits, Dr. Masami Tatsuno from Arizona, now an iCORE Scholar, and Dr. Aaron Gruber from the University of Maryland have recently joined the faculty. The Polaris award support has led to the hires of Drs. David Euston and Artur Luczak, who have joined Dr. McNaughton's Polaris research team. All of these new recruits to the University of Lethbridge are positioning the CCBN for more successes in research and training.

With the recruitment of high-profile researchers, new funding support for research infrastructure, and growing national and international recognition, the University of Lethbridge's CCBN researchers are well-positioned to make neuroscience discoveries that will impact the future of how we diagnose and treat diseases related to cognitive brain function.

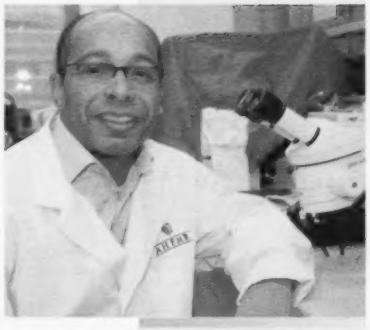
As this profile has shown, future success of the CCBN will doubtless be attributable to the University of Lethbridge's abiding strategic vision, which continues to recognize neuroscience research excellence and to pursue opportunities to sustain capacity-building success in an exciting field of importance to Alberta's prosperity and well being.

Early Support Spurs Groundbreaking Discoveries

Dr. Bernard Thébaud's recent discovery in lung development has some of its roots in the early career support he acquired through the Small Equipment Grants Program, and his key discovery will be advanced further because of the establishment of a new University of Alberta research centre supported by the 2009 Alberta Science and Research Investments Program competition (ASRIP).

Dr. Thébaud arrived in Edmonton as a postdoctoral fellow from France in 2002, and shortly thereafter became an Assistant Professor at the University of Alberta and Staff Physician at the Royal Alexandra Hospital, where he works with the Neonatal Intensive Care Program of the Stollery Children's Hospital. Dr. Thébaud is a paediatrician and medical researcher with a specialization in respiratory and vascular development. He studies the way the normal lung develops, and how the lung is injured during disease with an eye to advancing the development of new diagnostic tools and treatments for severe respiratory failure in newborns.

In 2005, Dr. Thébaud was awarded $77,000 from the Small Equipment Grants Program for his research project entitled "Experimental Lung Development and Therapy Core". The project's objective was to discover cures for lung diseases that currently lack effective treatments including: chronic lung disease of prematurity, cystic fibrosis, asthma, acute respiratory distress syndrome, fibrosis and emphysema. The SEGP award enabled Dr. Thébaud to purchase integral equipment that allowed his team to test the efficacy and safety of new treatments for these diseases.



Dr. Bernard Thébaud, University of Alberta

The combination of the right tools, the best talent, and research support spurred discovery. In November 2009, national news headlines pronounced that stem cells could repair lung damage. The discovery was made by an international team of scientists led by Dr. Thébaud. The team demonstrated for the first time that stem cells protect and repair the lungs of newborn rats. Premature babies are often treated with oxygen to compensate for underdeveloped lungs, but this lifesaving treatment may also slow or stop the lungs from fully developing. In his study, Dr. Thébaud's team simulated the conditions of prematurity by giving the newborn rats oxygen. The scientists then took stem cells, derived from bone marrow, and injected them into the rats' airways. Two weeks later, the rats treated with stem cells were able to run twice as far, and had better survival rates. When Dr. Thébaud's team looked at the rats' lungs, they found the stem cells had repaired the lungs and prevented further damage. The team's discovery offers promise for the development of new treatments for premature babies that have not fully developed their lung function, which often leads to chronic lung disease. The team's next steps likely

involve designing clinical trials to test their basic health research discovery, and exploring the findings to see how they might apply to other organs.

Dr. Thébaud is now even better positioned to advance his research program, as a team member on the 2009 ASRIP project "Cell and Tissue Innovation Research Centre". The project, led by the University of Alberta's Dr. Gregory Korbutt, will support the development of a specialized centre capable of producing clinical grade cells and tissues to treat a wide variety of chronic and acute diseases and injuries, including lung damage. Once fully established, the leading-edge centre will focus on developing insulin-producing cells for the treatment of diabetes, skin treatment for burn victims, and new treatments for lung disease. This facility will enhance and accelerate the possibility of developing commercial and clinical applications in Alberta, including Dr. Thébaud's recent discovery.

Dr. Thébaud's story illustrates the importance of sustaining avenues of support for Alberta's researchers throughout their careers. The access to specialized equipment at an early career stage was integral to spurring a promising discovery and enhancing the reputation of the research team. New support builds on this success by providing access to larger research infrastructure, and ultimately spurs related initiatives and multidisciplinary research teams—an innovative combination that leads to research outcomes of benefit to all Albertans.

Selected Project Highlights in the Life Sciences

Protein Crystallization, Macromolecular Interaction and Drug Design Infrastructure

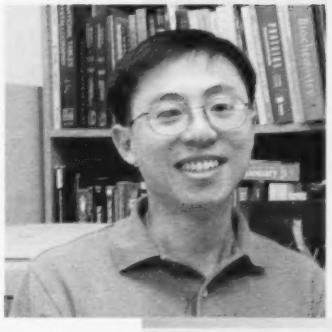
A new facility within the Department of Biological Sciences at the University of Calgary has been equipped with infrastructure that enhances Alberta's capacity in biotechnology. The equipment has enabled Dr. Kenneth Ng and his colleagues to further understand macromolecular interactions, investigate potential methods to improve the efficiency of protein crystallization, and will ultimately facilitate rational drug design. The equipment includes a liquid handling robot and crystallization imaging system, dynamic and static light scattering detectors, a high pressure liquid chromatography system and a spectrofluorimeter, all of which are housed within the facility.

The incredible opportunity to learn and train on this cutting edge equipment has attracted several post-doctoral fellows, graduate students and technicians to the University of Calgary. This infrastructure has been critical for the continuation of intensive collaborations within the Alberta Ingenuity Centre for Carbohydrate Sciences, which includes ten research teams at the University of Alberta and University of Calgary. The infrastructure has also helped ensure the continuation of very successful collaborations with researchers in Spain and Slovenia and has been instrumental in developing interactions with the Canadian biotechnology company Theracarb and the American biotechnology company Acambis.

Dr. Kenneth Ng and his team have determined the structures of toxins from *Clostridium difficile* and replication enzymes from the Noroviruses, major human pathogens and the leading causes of colitis and gastroenteritis, respectively, in North America and Europe. This knowledge has positioned the team to begin drug design studies for creating novel treatments for these poorly controlled diseases.

The infrastructure has helped the team to obtain several operating grants for carrying out research including two NSERC Discovery and two CIHR operating grants. The research supported by these provincial and federal agencies has been published in well-respected, peer-reviewed journals that have attracted attention throughout the world.

In the past year, two researchers have been recruited and two retained in part because of the availability of the infrastructure. In addition, five individuals have gained valuable skills by using this equipment.



Dr. Kenneth Ng, Department of Biological Sciences, University of Calgary

Dr. Ng's research will improve the efficiency of protein crystallization, and will ultimately facilitate new drug designs.

Functional and NeuroChemical Correlates of the Pathology of Parkinson's Disease

Dr. Gerlinde Metz, Department of Neuroscience, University of Lethbridge

The funds for this project have been used to acquire infrastructure to investigate factors that affect the pathology and recovery after motor system damage, including Parkinson's disease. The equipment includes a vibrating microtome, a microscope system, 3CCD camera and other instrumentation.

Despite the major progress in research, the causes of Parkinson's disease still remain largely unknown and no cure is available. Dr. Gerlinde Metz's research has introduced a novel concept of the cause of Parkinson's disease that covers aspects of neurodegeneration, compensation and treatment. She has determined that stress plays an important role in the development of Parkinson's disease by accelerating processes of cell death.

Dr. Metz's research uses an innovative combination of detailed behavioural and physiological measures with histological and neurochemical assessments. These methods are important stepping stones to pre-clinical research and are of high translational value for clinical investigations. For instance, findings may contribute to improving existing rehabilitation regimens in Parkinson's disease, and the development of new treatments.

Dr. Metz's research investigates the mechanisms and treatment of Parkinson's disease, stroke, and spinal cord injury.

Dr. Metz's laboratory has attracted several graduate students and postdoctoral fellows, from Canada and from other countries such as Iran, Germany and Brazil. The funded infrastructure has been central to providing a training environment that is competitive with top laboratories around the world. The infrastructure is readily available to students, which directly supports their training and productivity.

Along with several graduate research technicians, Dr. Metz has supervised three MSc and three PhD students. Three post-doctoral fellows are associated with her laboratory.

The infrastructure has also been pivotal in maintaining and expanding Dr. Metz's collaborations with investigators at the Canadian Centre for Behavioural Neuroscience, with investigators in other departments at the University of Lethbridge, the Hotchkiss Brain Institute in Calgary and in the US and Germany.

Dr. Metz has also been a scientific advisor for the contract research company Neuro-Investigations Inc., which is located at the University of Lethbridge. They maintain various collaborative projects, in which the infrastructure plays a major role.

Imaging Laboratory for Functional Recovery

The infrastructure within this facility was acquired to develop a unique, innovative, patient-based research laboratory for the investigation of brain function in the presence of neurological and neurovascular disease such as stroke and multiple sclerosis (MS). The critical infrastructure includes a real-time functional magnetic resonance imaging (fMRI) and post-processing software to determine the location of brain activity as the participant performs specific tasks, audio-visual equipment necessary for presenting participants with tasks to perform, a MR-compatible electroencephalography (EEG) system to measure electrical activity of the brain; a transcranial doppler ultrasound system to yield beat-by-beat measurements of cerebral blood flow; and computer and networking infrastructure to acquire, process, analyze, and archive the resulting data. This infrastructure was integrated with the facilities at the Seaman Family MR Research Centre, which includes a 3 Tesla whole-body MR scanner.

The infrastructure has added a new dimension to stroke and MS research in Calgary, as it provided the means to fully investigate neurological function in patients with these diseases. As a result, the infrastructure has put Calgary in a position to be a global leader in stroke and MS research.
Dr. Goodyear and his collaborators have had great success in attracting excellent students to receive their graduate training at the University of Calgary. These students see the potential impact of technology on patient care, an academic approach that is non-existent elsewhere. As a result, students are being trained with the skills to perform research in a collaborative and multidisciplinary environment. Funding agencies have also recognized this and are funding a number of projects related to the infrastructure. The presence of the infrastructure has played a major role in the decisions of several new recruits to the University of Calgary.

Dr. Bradley Goodyear, Hotckiss Brain Institute, University of Calgary

The infrastructure has fostered many fruitful collaborations between investigators at the University of Calgary, the University of Toronto, the University of Alberta, and the University of Lethbridge. To date, the infrastructure has led to over 10 peer-reviewed publications and well over 40 conference proceedings.

This work in conjunction with others eventually led to the formation of the spin-off company, Calgary Scientific, Inc., that develops image visualization software for clinical practice.

The research findings will likely lead to new clinical approaches for the diagnosis and treatment of neurological disease.

Building a Pediatric N-of-1 Research Service

Dr. Sunita Vohra, Director, CARE Program, Stollery Children's Hospital, University of Alberta

The infrastructure was essential to establish the "Drug Development and Innovation Center" to enable effective clinical trials at the University of Alberta. The project provided the equipment to manufacture and test clinical trial materials.

The infrastructure acquired from provincial and federal funding encompasses pharmaceutical testing and production instruments.

The infrastructure is important to enable clinical research by providing the needed equipment to manufacture and test clinical trial materials. Clinical trials are conducted to collect safety and efficacy data for new drugs or devices. The first clinical material was processed in 2008 and the first clinical trial was started in 2009.

The infrastructure has enabled new projects to be started in the facility. It has also become the nucleus for a campus wide initiative between Medicine, Pharmacy and Biomedical Engineering to establish a network of researchers and infrastructure to conduct drug development and medical device development at the University of Alberta. This network was established in 2008 and was approved as the "Drug Development and Innovation Center" (DDIC) in 2009.

New scientists were hired and retained in Alberta due to the availability of the infrastructure. One graduate student and one post-doctoral fellow also used the infrastructure to develop new methods to assess the interactions of inhalable nanoparticles and lung macrophages.

The infrastructure also enabled a project to investigate reasons for the instability of the United States Pharmacopeia (USP) standard. The USP is a non–governmental, official public standards–setting authority for prescription and over–the–counter medicines and other health care products.

The infrastructure is used on a fee for service basis to enable the research and development of local start-up companies. The infrastructure also has enabled research collaborations across disciplines and institutions including a collaborative study by the USP and Pan American Health Organization (PAHO).

The infrastructure connects clinical researchers with basic and pharmaceutical researchers; creating an interdisciplinary environment in which new ideas can be explored and tested. In this way the infrastructure will help to jump-start new nutraceutical and pharmaceutical companies.

Dr. Vohra anticipates that the "Center for Drug Development and Innovation" will be crucial to the University's future as it relates to discovery, training and employment opportunities for highly qualified personnel, and the economic benefits of potential spin-off companies through technology transfer to the business sector.

Functional Analysis of the Mitotic Checkpoint Using Live Cell Time-lapse Confocal Microscopy

The award supported the acquisition of a spinning disk laser confocal microscopy system. By investigating the molecular mechanism of the mitotic checkpoint, Dr. Chan and his research partners can better evaluate specific genes as potential cancer drug targets as well as contribute to the basic understanding of cancer.

This imaging system is designed for live cell time-lapse fluorescence microscopy and has enabled Dr. Gordon Chan and his research team to observe and measure live cells undergoing mitosis. This technique has made it possible to better understand the mitotic checkpoint mechanism in human cells. In addition, the imaging system is used by other researchers to push the leading edge of fundamental biology and medicine ahead. Recently, two papers have been published in the Journal of Cell Biology and Current Biology respectively (both journals with impact factor >10), demonstrating the great potential this infrastructure has to generate improvements in cancer treatment.

As part of the Department of Oncology, the spinning disk confocal imaging system further consolidates the facility as one of the best imaging centres in the country. This technical capability has great impact in establishing Alberta's competitive advantage in medical research. The full suite of advanced imaging at the Cell Imaging Facility is required to undertake mechanistic studies of cell biology of diseases.

The ability to perform innovative research, facilitated through the use of the infrastructure, has been instrumental in the establishment of several collaborations between Dr. Chan's research team and other researchers within the University of Alberta and other institutions world wide. Currently, the Chan Laboratory is collaborating with researchers at the University of Alberta, Ajou University, South Korea, the National Cancer Institute, the National Institutes of Health in the USA, the Fox Chase Cancer Center, Philadelphia, and the University of Toledo, Ohio.

The impact of this new equipment has extended beyond Dr. Chan's specific research program by contributing to the recruitment and training of highly qualified researchers. For example, two researchers have been recruited and four retained in part because of the availability of the infrastructure. In addition, five individuals have received training in the leading edge imaging techniques using this equipment.

Dr. Gordon Chan, Department of Oncology, University of Alberta

Dr. Chan can now observe cells undergoing cell division. Understanding this basic function contributes to understanding how cancer occurs.

Development of Cardiovascular Magnetic Resonance Imaging

Dr. Richard Thompson, Department of Biomedical Engineering, University of Calgary

Dr. Thompson's research focuses on the development of magnetic resonance imaging (MRI) for the clinical evaluation of cardiovascular disease.

The work enabled by this project is directly applicable to patients with cardiovascular disease, such as heart failure, myocardial infarction (heart attacks) and heart transplant recipients. It is likely that several aspects of what has been developed in Dr. Thompson's group will be applied clinically in the Magnetic Resonance Imaging (MRI) Center in the Mazankowski Alberta Heart Institute and at MRI Centers in Canada and around the world.

The MRI is a medical imaging technique most commonly used in radiology to view detailed internal structures and some functions of the body. The infrastructure acquired consists of two specialized radio-frequency (RF) receiver coils which collect the signal that generates the images. The performance of an MR scanner is highly dependent on the matching of the RF coil to the targeted anatomy, to optimize the resolution and the speed of the procedure. The RF coils purchased through this grant are matched to the geometry of heart/chest to enable imaging of the heart and lungs of children and adults.

The improved imaging capacity is important in improving our understanding of the mechanisms that impede heart function as a result of aging and cardiovascular diseases.

The ability to perform cutting edge cardiovascular imaging contributes to graduate training at the University of Calgary. Three graduate students under Dr. Thompson and several students in collaborative programs have been trained.

To date, the research programs of several collaborators (Cardiology, Rehabilitation Medicine at the University of Calgary), have benefited from the new research equipment. The infrastructure has also enhanced collaborations between biomedical engineering, cardiology, pediatric cardiology and rehabilitation medicine in Edmonton and Calgary. Several publications and conference presentations have resulted and several grants have been funded based on the availability of the infrastructure.

Centre for Integrative Chronobiology

The research of Dr. Michael Antle, a neuroscientist in the University of Calgary's Department of Psychology, involves understanding the circadian system. The human circadian clock, comprised of about 20,000 time-keeping cells, has mystified scientists since it was pinpointed in the brain about 30 years ago.

The circadian clock controls easily measurable behavioral and physiological processes. Scientists know that the circadian clock is located in the brain in the suprachiasmatic nucleus (SCN). Dr. Antle's work has conclusively shown that the 20,000 cells are organized in a complex network of groups that perform different functions — contrary to the previously held belief that each cell did the same thing. By studying this elegant system, Dr. Antle's research group can begin to understand how complex behaviors are regulated at the level of the brain, the cell, the genome and the molecule.

The long term goals of his research are to help understand and treat sleep and circadian disorders, such as those experienced by shift workers. Helping these people is not only of benefit to the worker, but is also of benefit to the people they serve. Circadian disruption is a major cause of workplace accidents. The costs of mistakes in workplaces that employ shift workers can be extreme, given the types of workplaces that use shift schedules (e.g., hospitals, factories, power plants, transportation, security, etc.).

The infrastructure provided by the Small Equipment Grants Program equipped a state-of-the-art chronobiology lab. Essential equipment for behavioural, anatomical and molecular examinations of the circadian clock was acquired. These included running wheels, computers, histology equipment, a cryostat, fridges and freezers, centrifuges, pH meters, a water purification system, equipment used to amplify segments of DNA for genetic models, and surgical and anesthesia equipment.

Dr. Michael Antle, Psychology Department University of Calgary.

Dr. Antle has collaborated with four other labs, resulting in six highly trained personnel using the infrastructure for their research. Five of these collaborations have resulted in publications.

In the last year, the availability of the infrastructure played a key role in the retention of five highly qualified personnel and aided in the recruitment of an additional five people. In that time, Dr. Antle's research group also trained approximately 10 personnel. All of these personnel have benefited in their research from the installed infrastructure.

The circadian clock controls measurable behavioral and physiological processes such as sleeping/waking cycles. By studying this elegant system, scientists can begin to understand how complex behaviors are regulated at the level of the brain, the cell, the genome and the molecule.

Alberta Science And Research Investments Program Project List 2000-2009

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
01-151-RI	Creation of a Research Institute for the Study of Supply Chain Collaboration	An outline supply chain simulation environment within which researchers will engage in collaborative research with the business community. Using broadband technology, the aim is to understand and apply collaboration technology, both within an individual business and business to business.	Kewal Dhariwal	Athabasca University	$2,423,000	$210,000	Other/ Multi-discipline
01-041-RI	Solid-State Nuclear Magnetic Resonance Facility	A state-of-the-art NMR facility for the investigation of solid materials. This facility will have a major impact on the research programs of several researchers in the physical sciences area and will serve as an important training ground for graduate students.	Roderick E. Wasylishen	University of Alberta	$1,400,000	$650,000	Other/ Multi-discipline
01-045-RI	Bamfield Marine Station - Infrastructure For Studies In Biodiversity and Bio-environmental Fluid Dynamics	Bamfield Marine Station will utilize infrastructure to support new research activities in the ecosystem time series and biodiversity studies of Barkley Sound, and bio-environmental fluid dynamics.	Andrew N. Spencer	University of Alberta	$3,046,755	$300,000	Life Sciences
01-047-RI	Understanding Land Cover Through a Strategic Infrastructure Development	The primary outcome of this proposal is the development of infrastructure that enhances our current abilities to process, store and manipulate extremely large imagery and related data, and data sets linked to provincial, national and international initiatives.	Arturo Sanchez-Azofeifa	University of Alberta	$898,478	$350,000	Life Sciences

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01-048-RI	Precision Ranching	Sustainable landscape and animal management systems. New and emerging technologies will be used to study complex spatial and temporal interactions among fauna, flora, climate, soils, topography and human factors and their response to management options.	Mick A. Price	University of Alberta	$1,137,300	$350,000	Life Sciences
01-049-RI	Meanook Biological Research Station (MBRS) Enhancement Proposal	MBRS is a year-round facility supporting critical research efforts to further the efficient and sustainable management of Canada's boreal forest. The award will expand the research capabilities of MBRS with the addition of a chemical lab and computing facilities housed in a new building.	Susan Hannon	University of Alberta	$670,000	$287,500	Life Sciences
01-050-RI	Molecular Characterization of Cancer Cell Populations by Single Cell and Living Cell Analysis	Funds for a laser microdissector and robotic microtweezers to isolate/ manipulate cells or subcellular regions. Multi-user laser-assisted technologies permit correlation of molecular properties with cell function, morphology and position within a cancer mass - a detailed analysis of fresh human tissue specimens is not otherwise possible.	Linda M. Pilarski	University of Alberta	$1,782,244	$533,000	Life Sciences
01-055-RI	Geochemical Analytical Facility	The facility will provide chemical analysis for multidisciplinary research on assessment and remediation of contaminated sites. Users from science and engineering will have access to much less expensive analysis for their research projects allowing increased analytical capability for enhanced data gathering.	Robert Donahue	University of Alberta	$667,100	$295,000	Energy
01-059-RI	Infrastructure for Surface Mining Research Laboratory	Infrastructure and facilities will achieve excellence in surface mining research and attract highly qualified researchers. They will maintain sustainable research programs to advance knowledge and frontiers in mining engineering, with impact on industry, Alberta and Canada.	Jozef Symanski	University of Alberta	$2,000,000	$660,000	Energy

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01-061-RI	Electronic Data Infrastructure Upgrade	A major upgrade of the networks, servers, and data security systems within the Department of Chemistry. Enhancements include faster networks, larger and faster servers, security systems designed to ensure data integrity.	Gary Horlick	University of Alberta	$459,079	$200,000	ICT
01-063-RI	Campus Alberta Research Data Centres	This project is part of a network of regional research data centres, providing secured access to select confidential data files from Statistics Canada. The Research Data Centres program is operational at thirteen universities and has smaller branches at six other universities.	Harvey Krahn	University of Alberta	$1,370,638	$685,316	ICT
01-066-RI **Project Cancelled**	Network Enabled Smart Robotic Systems	More advantageous deployment of robotics, sensing & network technologies in areas of community health, environment and resources in Alberta demands the need for a laboratory focused on advancing new ways of integrating fundamental research in these areas.	Max Meng	University of Alberta	$2,029,683	$300,000	ICT
01-070-RI	Whole Body Calorimetry	This initiative will result in development of a whole body calorimetry room at the U of A dedicated to accurate measurement of energy metabolism in humans. The unit will enable researchers to investigate mechanisms of energy utilization throughout the human life cycle and in various disease states.	Linda McCargar	University of Alberta	$770,000	$350,000	Life Sciences
01-162-RI	Phase I Clinical Trials and Research Unit	Medical unit for in-patient clinical trials and research. Purchases include a monitoring equipment-central station, a network of 16 peripheral physiological monitors, replacement of equipment for processing and storage of blood and samples, and minor renovations.	William McBlain	University of Alberta and Alberta Health Services	$363,932	$152,500	Life Sciences

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01-102-RI	Gene Therapy Initiative - the University of Calgary	Recent advances in biotechnology have made it possible to deliver foreign genes into cells for the treatment of human diseases. The purpose of this project is to establish a facility that will allow researchers to develop gene therapy.	C.W. Wong	University of Calgary	$2,366,142	$600,000	Life Sciences
01-105-RI	Nutrition, Genetics and Human Performance	Newly-equipped labs in the Faculty of Kinesiology toward the investigation of genetic risk factors and health status of elite athletes. In collaboration with the Faculty of Medicine, the team shares core technologies, enhanced recruitment and scientific interaction on this emerging health science.	Roy Gravel	University of Calgary	$8,527,202	$3,256,247	Life Sciences
01-111-RI	Multicomponent Seismic Data Acquisition System	A system for time-lapse monitoring of CO_2 injection and other acid gases in depleted hydrocarbon reservoirs and deep aquifers in Alberta. Geological sequestration of CO_2 is a viable technology for the reduction of greenhouse gas emissions.	Don C. Lawton	University of Calgary	$3,399,512	$1,160,000	Energy
01-113-RI	Language Research Facility	A facility for psycholinguistic experimentation on second language acquisition in adults and its implications for improvement of technology-enhanced language instruction, for curricular and teacher development, and for general policy issues related to second or heritage languages.	John Archibald	University of Calgary	$1,077,750	$430,000	Other/ Multi-discipline
01-120-RI	Genetics and Developmental Biology Laboratories	Establishment of the Genes and Development Research Group and the construction of a blend of individual labs without walls and specialized research facilities, (e.g. microsurgery, viral gene transfer, digital imaging). These facilities, coupled with the outstanding investigator group, will enhance Alberta's efforts in gene therapy.	Samuel Weiss	University of Calgary	$1,066,900	$190,000	Life Sciences

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01-123-RI	Integrated Centre for Advanced Materials Characterization	The acquisition of this instrument will serve to further strengthen our interdisciplinary research in areas such as the development of new solids, thin films, and polymers.	Viola I. Birss	University of Calgary	$1,700,373	$490,000	Other/ Multi-discipline
01-125-RI	Research Capability Upgrade of the Rothney Astrophysical Observatory	Instrument upgrade to remain competitive, train students in cutting edge astronomical instrumentation and observation. Improve infrared imaging through enhanced infrared and optical imaging cameras and controllers, spatial resolution through tip/tilt adaptive optics, improved efficiency through automation of telescopes.	E.F. Milone	University of Calgary	$552,000	$175,000	Other/ Multi-discipline
02-044-RI	NMR, GC-MS and computational tools to support research programs in chemistry and biochemistry	Core research tools for explaining chemical structures and understanding reaction pathways. Acquisition of spectroscopic, chromatographic, and computational equipment will support research and collaborations with industry and international scientists.	Peter Mahaffy	King's University College	$665,009	$200,000	ICT
02-043-RI	Advanced infrared physics laboratory	Advanced infrared physics laboratory for the development and calibration of radiometers and spectrometers for remote sensing.	David Naylor	University of Lethbridge	$197,500	$79,000	Other/ Multi-discipline
02-080-RI	Canadian Centre for Behavioural Neuroscience	Major equipment items include attachments for 500 MHz NMR to allow *in vitro* imaging of rats and mice, electrophysiological equipment and behavioural equipment.	Bryan Kolb	University of Lethbridge	$770,780	$272,429	Life Sciences

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02-125-RI	The Banff International Research Station for Mathematical Innovation and Discovery (BIRS)	A collaborative Canada-US-Mexico venture to operate an international centre for the mathematical sciences and its applications. Infrastructure is for a computer network and essential renovations to the Banff Centre.	Art Nutt	The Banff Centre	$1,507,778	$500,000	Other/ Multi-discipline
02-045-RI	Spindle Position and Checkpoint Control During Mitosis	Research into the mechanisms for nuclear and spindle positioning and the signaling pathways controlling cell division.	Neil Adames	University of Alberta	$530,220.00	$212,088	Life Sciences
02-046-RI	Laboratory for Colloids and Complex Fluids	A laboratory to investigate and control the properties of complex fluids, such that are found in oil sands processing, wastewater treatment, pulp and paper manufacturing and biological fluids.	Subir Bhattacharjee	University of Alberta	$312,500	$125,000	Energy
02-047-RI	High-Capacity Digital Communications Lab	A research laboratory to facilitate design, simulation, implementation and testing of high capacity, high reliability digital communications systems.	Christian Schlegel	University of Alberta	$312,500	$125,000	ICT

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02-058-RI	Nanofabrication Facility	The facility will significantly extend the capabilities of the existing open-access Microfab to that of the best in Canada. Enables innovative research in nano-biotechnologies, nanoscience, and nanomaterials in ICT, health, and resource sectors.	Michael Brett	University of Alberta	$8,247,533	$3,082,460	Other/ Multi-discipline
02-060-RI	Protective Clothing and Equipment Research Facility	An enhanced flash fire simulation, instrumented mannequin facility, and equipment for fundamental material combustion studies, combined heat, mass and moisture transfer studies and ultra-violet protection research.	Elizabeth Crown	University of Alberta	$1,462,301	$537,462	Other/ Multi-discipline
02-062-RI	Centre for Comparative Psycholinguistics	Enables the multifaceted psycholinguistic study of language representation and processing among speakers of indigenous and minority languages.	Libben, Gary	University of Alberta	$743,685	$297,474	Other/ Multi-discipline
02-066-RI	Westgrid: The Western Canada Research Computing Grid	An integrated system of high-performance computing facilities, data storage capability, collaborative work sites, high-speed networks, and human resources that together provides a unique shared research infrastructure designed for and by research groups across Alberta and British Columbia.	Jonathan Schaeffer	University of Alberta	$40,571,910	$5,995,420	ICT
02-067-RI	Tailings Research Facility	The facility comprised of delivery, treatment and deposition modules carries out research to develop novel and innovative approaches to treating tailings to reduce the environmental impact of the bitumen extraction.	David C. Sego	University of Alberta	$2,000,000	$500,000	Energy

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02-068-RI	Facility for Study of Effectiveness of Collaborative, Distributed Software Development	To support research on how software can be conceived, developed and maintained collaboratively in distributed locations. Special focus is on heterogeneous development environments, embedded systems, and software product lines.	Paul Sorenson	University of Alberta	$1,654,174	$546,350	ICT
02-069-RI	High-Field MR for Biological Image-Guided Tomotherapy	A high-field (3T) MR system to develop biological tumor targeting for adaptive tomotherapy, and to study the subsequent metabolic and biochemical treatment effects on tumors and healthy tissues.	Gino Fallone	University of Alberta	$9,776,300	$3,846,000	Life Sciences
02-083-RI	University of Alberta Heart & Stroke Research Centre	A transnational human vascular biology research facility for the new Mazankowski Alberta Heart Institute. It will study the effects of heart attacks and strokes, and houses state-of-the-art cardiovascular imaging tools, basic science core labs, a gene therapy facility and an outcomes research centre.	Gary Lopaschuk	University of Alberta	$16,613,301	$3,244,910	Life Sciences
02-091-RI	Project Cyber-Cell - Proteomics, Metabonomics and Functional Genomics Experimental Component	To quantitatively determine the dynamic and structural nature of cellular processes in *E. coli*, with the ultimate goal of recreating the living cell computationally. This is a joint project from the Universities of Alberta, Calgary and Lethbridge.	Joel Weiner	University of Alberta	$17,454,775	$4,700,000	Life Sciences
02-105-RI	Alberta Centre for Surface Engineering and Science (ACSES)	An integrated facility for surface characterization and modification, supporting interdisciplinary research throughout Alberta. Essential instruments previously not available or not generally accessible within the province are provided.	Doug Ivey	University of Alberta	$13,163,230	$4,000,000	Energy

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02-107-RI	The University of Alberta Protein and Gene Discovery Centre	New technology and facilities for research in high-throughput chemical genetics, genomics and proteomics.	D. Jed Harrison	University of Alberta	$9,840,289	$1,800,000	Life Sciences
02-108-RI	Modern Infrastructure to Support Inter-disciplinary Water Chemistry in the 21st Century	Research in industrial impacts on environmental and human health. Included are a freshwater biogeochemistry laboratory facility, and three fully gauged and monitored experimental catchments in boreal plains, foothills, and alpine locations in Alberta.	David Schindler	University of Alberta	$9,630,188	$1,400,000	Life Sciences
02-109-RI	Alberta Cooperative Conservation Research Unit: Infrastructure for Studies in Conservation Science	The Unit functions as a central 'umbrella' for research innovation including biomonitoring, landscape and population modeling, and application of telemetry, GPS, GIS and DNA fingerprinting to resource management.	William M. Samuel	University of Alberta	$2,483,826	$320,000	Life Sciences
02-121-RI	Ion Beam Laboratory for Nanoscale Materials Processing and Patterning	A combined facility for advanced ion implementation and optical and nanostructural characterization.	Raymond Egerton	University of Alberta	$661,853	$199,575	Life Sciences

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02-088-RI	Creation of the Alberta Diabetes Research Centre (ADRC)	A state-of-the-art multidisciplinary diabetes research facility. This research centre will provide Alberta with the infrastructure and resources needed to maintain and expand its existing diabetes research excellence.	Raymond Rajotte	University of Alberta	$39,832,358	$6,000,000	Life Sciences
02-090-RI	Centre of Excellence for Viral Hepatitis Research	A multidisciplinary centre which builds and equips new space (13,250 sq. ft.) including animal facilities, provides equipment for existing laboratories, expands our tissue bank and establishes a node in a national database for viral hepatitis.	D. Lorne Tyrrell	University of Alberta	$9,264,007	$2,000,000	Life Sciences
02-048-RI	Large Scale Tissue Culture and Bioreactor Facilities for Biomedical and Biochemical Engineering Research	Infrastructure for the Pharmaceutical Production Research Facility including computer controlled bioreactors and fluorescence microscopy equipment.	Leo Behie	University of Calgary	$378,830	$151,532	Life Sciences
02-049-RI	Cellular Mechanobiology and Surgical Simulation in Orthopedic Bioengineering	Research into invertebral disc degeneration and osteoarthritis including tissue engineering and the development of surgical simulations.	Neil Duncan	University of Calgary	$428,897	$125,000	Life Sciences
02-050-RI	Energy and Imaging	A laboratory where imaging techniques are used as tools to solve chemical and petroleum engineering problems.	Apostolos Kantzas	University of Calgary	$650,000	$175,000	Energy

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02-051-RI	Molecular and Cellular Biomechanics and Biomedical Engineering	Laboratories for molecular and cellular biomechanics and biomedical engineering research. The long-term aim of research in these facilities is to gain an understanding of musculo-skeletal growth, adaptation, healing and ageing.	Walter Herzog	University of Calgary	$315,586	$123,078	Life Sciences
02-052-RI	Analysis of Gene Regulation and Function Using Transgenic Model Systems	Equipment to expand the ability at the University of Calgary to carry out sophisticated types of phenotype analysis in transgenic animals.	Frank Jirik	University of Calgary	$317,754	$127,100	Life Sciences
02-053-RI	Medical Genetics Research Laboratory	Meiotic research infrastructure to understand mechanisms that affect the production of chromosomal abnormalities in human gametes.	Renee Martin	University of Calgary	$313,572	$95,988	Life Sciences
02-054-RI	Cellular / Molecular Biology Core Equipment	Equipment for the new Respiratory Research Group initiative on the molecular pathogenesis of inflammatory airway diseases. A major focus will be on defining the mechanisms underlying virally-induced exacerbations leading to asthma.	David Proud	University of Calgary	$316,894	$125,000	Life Sciences
02-055-RI	Studies on the Cause, Prevention and Cure of Type 1 Diabetes	Research to find the mechanisms involved in the initiation of beta cell specific immune responses and development of methods for the prevention of autoimmune diabetes. Additional plans are to develop a cure for type 1 diabetes by a novel insulin gene therapy.	JiWon Yoon	University of Calgary	$640,000	$136,000	Life Sciences

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02-056-RI	Plant Metabolic Processes Biotechnology	Infrastructure for a laboratory engaged in research on the biochemistry, molecular biology, and biotechnology of plants.	Peter Facchini	University of Calgary	$372,589	$143,590	Life Sciences
02-057-RI	RHODIUM: A Pentium Computer Ranch for Catalyst Design and Chemical Modeling	A facility to carry out modeling of catalytic processing through assembly of a multi-processing computer.	Tom Ziegler	University of Calgary	$312,500	$125,000	ICT
02-075-RI	Hybrid Passive-Active Lighting, Ventilation, and Thermal Systems for Commercial and Institutional Buildings	The project is a 200 m^2 full-scale building that would serve as a dedicated testbed for developing and evaluating innovative energy systems for buildings.	James Love	University of Calgary	$348,000	$139,200	Energy
02-077-RI	Experimental Laboratory for Internet Systems and Applications (ELISA)	The project provides network measurement equipment at the University of Calgary as part of a geographically distributed internet systems testbed shared with the University of Saskatchewan.	Carey Williamson	University of Calgary	$3,078,704	$605,000	ICT
02-124-RI	ICU CaRES Program	Infrastructure for the acquisition, cataloguing, and storage of human material necessary for the investigation of biological mechanisms of disease.	Brent W. Winston	University of Calgary	$2,234,249	$165,000	Life Sciences

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02-093-RI	Broadband Network Reworking in Support of Bioinformatics and Imaging	Higher bandwidth connectivity is required by the Faculty of Medicine's life sciences researchers, especially those leading the ICT-intensive fields of bioinformatics and imaging, in order to remain competitive at the national and international level.	Christoph Sensen	University of Calgary	$2,955,955	$800,000	Life Sciences
02-096-RI	Centre for Advanced Functional Imaging Studies	The development of a centre that performs molecular imaging. The 9.4 Tesla magnet and a future 10 Tesla magnet permits innovative, advanced research in the use of MR imaging to investigate disease and therapeutics in animal model systems.	Jeff Dunn	University of Calgary	$23,657,302	$1,800,000	Life Sciences
02-097-RI	Centre for Health and Policy Studies (CHAPS)	CHAPS will improve the health of Albertans and the efficiency of health care delivery in the Province. This innovation brings together core CHAPS disciplines of economics, population health, health policy analysis and health care utilization and involves close collaboration with related disciplines across the whole university.	Thomas Noseworthy	University of Calgary	$1,656,825	$150,000	Life Sciences
02-098-RI	Integrating Research in Osteoarthritis: From the bedside to the bench and back again	A consortium of musculoskeletal investigators from the faculties of Medicine, Engineering, Kinesiology, and Science, will integrate research efforts into osteoarthritis, a degenerative disease. Equipment will consolidate four facilities and two core resources to enable the necessary multidisciplinary, translation research.	David Hart	University of Calgary	$12,710,038	$1,900,000	Life Sciences
02-100-RI	Centre for mouse genetics, physiological systems and disease	Investigators will use genetic approaches in mice to model and understand normal development and disease in humans. They will conduct both high throughput mutation genes and analysis of complex mutant phenotypes, supporting Alberta's important national and international role in functional genomics research.	James Cross	University of Calgary	$19,356,461	$2,900,000	Life Sciences

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02-999-RI	Athabasca University Geophysical Observatory	The geophysical observatory infrastructure consists of a state-of-the-art auroral all-sky imager. A ground-based magnetometer complements the imager by detecting the magnetic fields associated with the aurora.	Martin Connors	Athabasca University	$294,200	$115,000	Other/ Multi-discipline
04-021-RI	Centre of Excellence for Gastrointestinal Inflammation and Immunity Research	The Centre will support a multi-disciplinary team of medical scientists in examining the environmental, microbial, immunological and genetic factors that cause the gastrointestinal disorders and related cancers that afflict 60 per cent of Canadians in their lifetime.	Richard Fedorak	University of Alberta	$20,508,807	$4,605,013	Life Sciences
04-031-RI	Cardiovascular Translational Research Centre	An innovative centre to facilitate the development of new therapeutic strategies to improve the outcome of cardiac surgery. The research has a strong translational focus, which will result in research advances being rapidly translated into optimal clinical care for the cardiac patient.	Gary Lopaschuk	University of Alberta	$14,233,036	$2,500,000	Life Sciences
04-032-RI	Integrated Nanosytems Research Facility (INRF)	The INRF will consist of four components that will encompass fabricating nanomaterials, the self-assembly and synthesis of molecules, nanoscale manipulation and the computing power to model, design and visualize nanosystems.	David T Lynch	University of Alberta	$74,727,796	$4,883,118	Other/ Multi-discipline
04-033-RI	Oil Sands and Coal Interfacial Engineering Facility	A state-of-the-art facility supporting research to develop step-out technologies in oil sands processing, bitumen extraction and upgrading, producing clean energy from coal, environmental impact minimization and improved water utilization. These issues are approached at the micro- and nano-scale and have the potential to revolutionize bitumen extraction and upgrading.	Jacob Masliyah	University of Alberta	$5,853,787	$1,429,669	Energy

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04-036-RI	Nanophotonics Microscopy Unit	A state-of-the-art laboratory for ultra-fine-scale characterization of fluorescent materials for nanotechnology. Research in this emerging field could lead to many applications in areas related to microphotonics and information technologies in which the special light-emitting properties of nanoscale semiconductors may play an important role.	Al Meldrum	University of Alberta	$472,294	$152,000	Other/ Multi-discipline
04-037-RI	Agricultural Genomics and Proteomics Centre	The infrastructure will enable the world-class researchers to identify genes and related proteins affecting processes in animal agriculture that are highly relevant to industry, including growth, waste production, and efficient nutrient utilization.	Stephen Moore	University of Alberta	$3,372,758	$1,100,000	Life Sciences
04-042-RI	Field Facility to Support Ecosystem Management Emulating Natural Disturbances	The research seeks to understand the impact forest harvest has on forest habitats, biodiversity, and forest regeneration in an effort to optimize forest management in relation to costs and long-term benefits.	John Spence	University of Alberta	$595,028	$223,740	Life Sciences
04-044-RI	Project to Restore Movement	A range of brain stimulation equipment that will place the project at the very forefront of non-invasive study of brain function. The overall goal is to understand the normal control of movements and to use this knowledge to enhance and restore movements to people with motor disabilities resulting from strokes, accidents and other causes.	Richard Stein	University of Alberta	$4,413,635	$510,600	Life Sciences
04-051-RI **Project Cancelled**	Canadian Molecular Cytogenetics Platform: Health Technology Assessment Facility	A national consortium of researchers and clinicians studying the application of advanced molecular cytogenetic technologies. Cytogenics is a unique diagnostic tool that can identify abnormalities in an individual's genome that can cause birth defects, developmental delay, mental retardation, growth abnormalities, infertility, recurrent miscarriages and cancer.	Darrell Tomkins	University of Alberta	$11,282,309	$47,714	Life Sciences

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04-063-RI	Canadian Pain Trials Network	The goals are to create new therapies, build a national pain database, develop health policies to reduce the incidence of pain, decrease its socioeconomic impact and maximize opportunities for commercialization. The network will coordinate multi-centre clinical trials for the development of novel therapies, and develop an innovative clinical research training program.	Paul Taenzer	University of Calgary	$55,469	$22,507	Life Sciences
04-067-RI	Institute for Inflammatory Diseases: A common focus for the improvement of health	The Institute brings together the facilities and researchers to develop new strategies for prevention and treatment of inflammatory disease that will lead to improved quality of life and reduced mortality, while marketing drug discoveries and creating knowledge-based jobs.	Paul Kubes	University of Calgary	$18,629,196	$2,009,943	Life Sciences
04-068-RI	Project neuroARM: MR compatible image guided robot for microsurgery	Development of an innovative medical robot system designed to enhance human-guided, robot microsurgery through magnetic resonance image (MRI) guidance, tremor elimination and increased spatial resolution.	Garnette Sutherland	University of Calgary	$30,000,357	$3,000,000	Life Sciences
04-069-RI	Brain, Behaviour and Cognitive Science Imaging Facility	The expansion of the Canadian Centre for Behavioural Neuroscience (CCBN) will allow researchers to take full advantage of the equipment and collaborations by bringing together researchers from Psychology, Neuroscience, Biology and Biochemistry to tackle the main research themes at the CCBN: spatial cognition and memory, motor control, neurological disorders (e.g., Parkinson's disease, fetal alcohol syndrome, and stroke), drug addiction and brain plasticity.	Bryan Kolb	University of Lethbridge	$2,865,272	$933,082	Life Sciences

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06-317-RI	Alberta Institute for Viral Immunology (AIVI)	The infrastructure funded will create biosafe and biosecure laboratories where innovative research may generate insights into how viruses infect cells and cause disease, and how immune defenses provide protection from these diseases. Design details include safe places to store, incubate and dispose of viruses; unique plumbing to ensure the water supply is protected; and specially designed robots that handle hazardous liquids and plates.	David Evans	University of Alberta	$24,926,384	$6,941,811	Life Sciences
06-320-RI	Alberta Centre for Prions and Protein Folding Diseases (ACPPFD)	The funding will support research activities into prion diseases and other diseases of protein folding through initiatives such as developing technology options for the rapid detection and potential treatment of BSE in cattle and the design of prion decontamination systems for water, land, laboratories, etc.	Richard Rachubinski	University of Alberta	$12,137,665	$4,855,066	Life Sciences
06-327-RI	Creation of the Alberta Transplant Applied Genomics Centre (ATAGC)	The centre will integrate clinical and basic research and use complex gene technology to improve disease diagnosis both before and after transplants. The investment will help researchers better understand disease processes, improve patient care, and enhance teaching and training opportunities and will result in health benefits for Albertans and people around the world.	Philip Halloran	University of Alberta	$12,661,021	$4,134,936	Life Sciences
06-329-RI	Ultrafast Nanotools Laboratory	The award will be used to purchase infrastructure for an integrated grouping of instruments to help researchers understand the nature of nanomaterials, and develop novel techniques for measuring the speed of nanodevices. The lab will be unique in the world, attracting leading researchers to Alberta and providing support and trainees to Alberta nanotechnology companies in the emerging market of microwave nanodevices.	Frank Hegmann	University of Alberta	$3,178,702	$975,000	Other/ Multi-discipline

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
06-355-RI	Canadian Centre for Isotopic Microanalysis	Canadian Centre for Isotopic Microanalysis – The facility will enable more detailed and accurate imaging and analysis of non-renewable resources than is currently available in Canada. The research team will investigate methods of mining diamonds and other minerals while helping to reduce the environmental impacts of resource development and enhancing Canada's competitiveness as a world supplier of hydrocarbon and mineral resources.	Thomas Stachel,	University of Alberta	$13,215,959	$4,447,595	Energy
06-365-IS	Nanofabrication Facility Expansion	The award will be used to purchase equipment for the Micromachining and Nanofabrication Facility (NanoFab), to meet the needs of more than 550 researchers, industry and government. With this new infrastructure, Alberta will be home to one of the top five such laboratories in North America. NanoFab's open-access operational model brings together researchers from diverse disciplines, institutions, and companies in one location, maximizing opportunities for new research ideas and products through previously unlikely collaborations.	Michael Brett	University of Alberta	$5,264,699	$2,062,672	Other/ Multi-discipline
06-350-RI	Gene Silencing and Sequencing Facility	Funding will strengthen the technological services provided by this one-of-a-kind facility in Canada and allow economies of scale – making large projects affordable and contributing to innovative research on: cancer treatment, stem-cells, prion disease, genetic risk factors, and the immune system. The research offers the promise of a new generation of more effective drugs to combat genetic diseases.	Richard T. Pon	University of Calgary	$800,434	$320,174	Life Sciences
06-367-IS	In-Situ Upgrading: The Next Generation Technology for Canada's World Class, Oil Sands Energy Resources	Infrastructure for the continued development of new *in-situ* upgrading techniques that utilize ultradispersed nanocatalysts to efficiently extract a medium quality crude oil directly from the earth. The *in-situ* recovery technologies will reduce natural gas consumption, address environmental concerns and create new value-added products.	Pedro Pereira Almao	University of Calgary	$23,335,814	$6,026,791	Energy

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
06-369-IS	Advancing Intraoperative MRI (iMRI)	State-of-the-art upgrades to the iMRI system will allow for safer brain surgery and expand imaging capabilities to include surgical guidance and monitoring for the entire body so surgeons can more accurately plan the surgical corridor while minimizing trauma to the patient.	Garnette Sutherland	University of Calgary	$10,448,367	$4,001,110	Life Sciences
06-371-IS	Laboratory for Imaging Spectroscopy Applications	Developing new instrumentation for remote sensing will support the diverse applications of spectral imaging systems, which include astronomical imaging (star formation, galactic evolution), environmental monitoring (pollution in rivers, industrial plants, growth of illegal crops), earth observations from airspace (crop management, city planning), biomedical imaging (cell abnormalities, microscopy) counterfeit detection (money, art) and retinal imaging (security, glaucoma).	David Naylor	University of Lethbridge	$1,856,900	$742,760	Other/ Multi-discipline
06-372-IS	Submillimeter Instruments for Astronomy	The research team, through the Alberta Centre for Advanced Imaging, will contribute unique expertise in the hardware, software and analysis techniques to the production of the Fourier Transform Spectrometer for the James Clerk Maxwell Telescope in Hawaii. This collaborative project involves four Canadian institutions and international collaborators, and supports the technology development of improved imaging tools to be applied in numerous fields.	David Naylor	University of Lethbridge	$6,772,280	$408,000	Other/ Multi-discipline
06-375-PT	Compute Canada – Alberta	This initiative enhances and links the high performance computing infrastructure of academic institutions across Canada. Through the WestGrid Consortia, which includes 4 Alberta institutions, the investment will help researchers in a broad range of disciplines solve complex problems quickly by providing access to powerful high performance computing resources, technical support and tools for visualization and scientific collaboration across institutions.	Jonathan Schaeffer	U of A, U of C, U of L, AU, Banff Centre	$59,999,997	$6,750,000	Other/ Multi-discipline

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
06-348-PT	Synergies: The Canadian Information Network for Research in the Social Sciences and Humanities	Funding supports Alberta's role in this national project, a cooperative effort amongst 25 universities across Canada to create trusted repositories that will allow for permanent access to research output. The Synergies initiative will form a single, decentralized, multidisciplinary database of Canadian research which will improve researchers' access to online resources and give them cutting-edge tools to do their research.	Mary Westell	University of Calgary	$11,446,077	$408,409	Other/ Multi-discipline
09-105-RI	Geomechanical/Reservoir Experimental Facility (GeoREF)	The GeoREF will provide the tools to gain critical knowledge of the behavior of oil sands, shale, and carbonates during thermal recovery processes. Research outcomes from the GeoREF will underpin the technology for carbon storage projects and support the sustainable, safe development of Alberta's unconventional hydrocarbon resources, including coal gasification.	Rick Chalaturnyk	University of Alberta	$4,078,511	$1,630,061	(Energy - 100)
09-107-RI	Ultraclean Isotope Analysis Facility for Innovative Geochronology	Dr. Creaser and his research team are world leaders in isotope geochemistry. The infrastructure provides the needed tools for innovative geochronology research in areas relating to energy and natural resources. The Isotope Analysis Facility will enable researchers to provide the scientific underpinning which guides industry in their efforts to explore and make use of mineral and petroleum resources.	Robert Creaser	University of Alberta	$1,292,627	$517,051	(Energy - 50), (Other - 50)
09-208-RI	The Resolute Bay Incoherent Scatter Radar: A Space Science Initiative in Nunavut	The award will build a world-leading facility for direct ionospheric observations in Canada's North which will operate synergistically with a facility in the U.S. Arctic. RISR will enable researchers to study the significant effects of space weather on satellite and aircraft communication and navigation systems and its longer term effects on the environment and climate change. The RISR provides the Calgary region with commercialization opportunities in global navigation satellite systems, GPS accuracy, and new technologies to rapidly access remote data.	Eric Donovan	University of Calgary	$24,343,381	$7,128,810	(ICT - 40), (Other - 60)

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
09-212-RI	Rapid and Secured Communication Network for Exchange of Medical Images in the Canadian Atherosclerosis Imaging Network (CAIN) - CFI National Award	CAIN is one of the leading national collaborative networks in Canada. The research infrastructure will create a rapid and secure communication network, state-of-the-art image management and analysis software, and innovative imaging technologies. This technology will enable the sharing of clinical and research data across the country to improve the diagnosis and treatment of heart disease.	Richard Frayne	University of Calgary	$3,043,418	$1,217,367	(Life Sciences - 75), (ICT - 25)
09-216-RI	Canadian Longitudinal Study on Aging	The equipment purchased will enable the development of a tremendous source of long-term information which will be used to answer basic research, clinical, and population health questions. The award provides the equipment to collect health measurements from patient participants and the computational resources to share the data securely across this national network of researchers. The high quality of the data will allow researchers to address complex population health and policy questions related to an aging population which were otherwise not feasible.	David Hogan	University of Calgary	$957,552	$383,021	(Life Sciences - 100)
09-117-RI	Subzero Facility for Processing and Analysis of Hydrocarbons in Pristine Planetary Samples	A unique facility will be built in Alberta so that researchers may store, process, and handle pristine astromaterials, including meteorites. The facility will protect the valuable samples from any further earth-based contamination that they could receive. This new facility will also support the work of Dr. John Shaw, NSERC Industrial Chair in Petroleum Thermodynamics at the University of Alberta.	Christopher Herd	University of Alberta	$434,005	$173,602	(Energy - 90), (Other - 10)
09-220-IS	emSYSCAN: Embedded Systems Canada	emSYSCAN is a national embedded computerized systems initiative. The infrastructure will allow researchers to meet the challenge of the global shift from discrete chip-based electronics products to those that implement complete systems on a single computer chip. The network enables prototype development and provides access to a library of system components and computer-aided design tools through secure internet communication links. The research is closely linked to industry to enable rapid commercial deployment of new applications in the fields of information and computer technology, medicine, and biotechnology.	Karan Kaler	University of Calgary	$3,813,875	$1,525,551	(Energy - 20), (Life Sciences - 20), (Other - 40), (ICT - 20)

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
09-122-RI	Cell and Tissue Innovative Research Centre (CTIRC)	The funding will support the development of a specialized centre capable of producing clinical grade cells and tissues to treat a wide variety of chronic and acute diseases and injuries. The Centre will focus on developing insulin-producing cells for the treatment of diabetes, skin treatment for burn victims, and developing new treatments for people with lung disease. This type of facility will enhance and accelerate the possibility of developing commercial and clinical applications in Alberta.	Gregory S Korbutt	University of Alberta	$26,509,863	$10,603,945	(Life Sciences - 100)
09-224-RI	ACWA: Advancing Canadian Wastewater Assets	The ACWA Research Facility will integrate engineering, chemical, and biological expertise with a full-scale research approach to address wastewater treatment and environmental water issues in Alberta. The ACWA initiative is an innovative collaboration with the City of Calgary's Pine Creek Wastewater Treatment Plant, through which scientists will investigate and demonstrate new technologies to treat contaminants and minimize their impacts on aquatic ecosystems and public health.	Edward McCauley	University of Calgary	$29,506,447	$10,373,152	(Life Sciences - 70), (Other - 30)
09-128-RI	ENVIRO-NET: Sensing our Changing Environment	The ENVIRO-NET infrastructure will provide unique research opportunities in sensor design, networking and communication, data mining, storage, retrieval, management, and analysis. The infrastructure will use integration of carbon flux measurement instruments and advanced GPS applications aimed at monitoring the response of boreal forests to industrial development and other climate change indicators. The infrastructure will position the University of Alberta as one of the key players worldwide in the design and implementation of wireless sensor networks for environmental monitoring and assessment.	Arturo Sanchez-Azofeifa	University of Alberta	$1,816,200	$726,480	(Life Sciences - 50), (ICT - 50)
09-329-RI	Southern Alberta Group for Epigenetic Studies (SAGES) - Epigenetic Regulation of Cell Memory and Stress Responses	Epigenetics is the study of changes in appearance or gene expression that are not related to changes in the DNA sequence. This award will bring together researchers in the institution's areas of strength (neuroscience and molecular biology) to lead in this emerging area of research. SAGES will enable scientists to make major new discoveries related to improved understanding and treatment of human disease (e.g., cancer, Parkinson's Alzheimer's), new biofuel models, and environmental toxicology, to name a few.	Robert Sutherland	University of Lethbridge	$8,108,014	$2,816,548	(Life Sciences - 100)

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
09-132-RI	Instrumentation for Molecular Breeding for Specialty Oils	The award will support the development of specialty oilseed crops, such as canola and flax for the production of enhanced oils for human health and nutrition. The integration of plant biotechnology and nutritional science will optimize the impact of the research. The project will strike a balance between scientific push and industrial pull to add value to Alberta's traditional crops.	Randall Wese-lake	University of Alberta	$5,830,110	$2,329,057	(Energy - 20), (Life Sciences - 80)
09-235-RI	Regeneration Unit in Neurobiology (RUN)	The focus of this award is to provide the neurobiology research team with the tools required to apply innovative approaches to study the possibility of regeneration after major nerve and spinal cord injuries. The facilities will be amongst the best in the world and, in the hands of this strong team, will accelerate the development of new treatments for people with nerve and spinal cord injuries.	Douglas Zochodne	University of Calgary	$3,240,933	$1,296,372	(Life Sciences - 100)
09-137-IS	Enhancing the Science: Polarized Photons and Improved Endstations for the SGM and PGM at the Canadian Light Source	The Canadian Light Source (CLS) award brings an already productive photon tool to the leading edge of light source imaging. The tool will enable researchers to view various materials, nanostructures, catalysts, and biological tissues. Research conducted at the facility is interdisciplinary and will impact many sectors, including agriculture, health, ICT, materials, mining, oil and gas, and pharmaceutical sciences.	Jonathan Veinot	University of Alberta	$4,047,255	$150,943	(Energy - 40), (Other - 60)
09-138-IS	The Canadian Writing Research Collaboratory	The infrastructure will create a virtual online "lab" that will transform the study of Canadian writing by facilitating data sharing and analysis, networking, and collaboration for scholars worldwide, and establish a major open-access resource on Canadian writers and writing. It will enhance Alberta's information and communication technology infrastructure by providing a model for geographically distributed teams to work effectively to create high-quality knowledge resources for research, policy development, and industry collaboration.	Susan Brown	University of Alberta	$2,640,786	$1,049,608	(ICT - 100)

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	ASRIP Funds Approved	Key Strategic Area
09-440-IS	Athabasca University Geophysical Observatory Upgrades of Research Infrastructure (AUGOURI)	The infrastructure will enhance the Athabasca University Geophysical Observatory and in turn strengthen and expand the AUGOURI's international collaborations with the world's leading space scientists. The research observatory will study the radiation belts that surround the planet, the northern lights, and their relation to an unknown mechanism called "substorms" which are able to interrupt electrical power grids on the earth.	Martin Connors	Athabasca University	$1,852,864	$712,261	(Energy - 30), (ICT - 20), (Other - 50)
09-142-RI	Alberta Particle Astrophysics Experiments at SNOLAB: SNO+ and DEAP/ CLEAN	The SNOLAB project will keep Canada and Alberta at the international forefront of neutrino and dark matter physics. SNOLAB is a national research project, with strong international ties, to measure properties of particles that are critical to the formation and evolution of the universe. While the research is fundamental, there is long-term potential for contributions to understanding basic energy generation in the sun which impacts our climate systems and models.	Aksel Hallin	University of Alberta	$3,774,593	$1,509,837	(Energy - 35), (ICT - 10), (Other - 55)
09-144-IS	New Control System for MTS Hydraulic Testing Machine - Part of CFI LEF Application: Centre for Industrial Application of Microcellular Plastics	The Centre will develop innovative products and processing technologies for microcellular plastics, a new generation of materials that exhibit superior mechanical performance and significantly improve their sound and thermal insulation properties. Researchers at the University of Alberta will provide fatigue resistance testing and evaluation of the new microcellular plastics.	P-Y Ben Jar	University of Alberta	$108,584	$43,433	(Energy - 20), (Life Sciences - 30), (Other - 50)
				TOTAL:	$794,195,522	$169,188,028	

Small Equipment Grants Program/New Opportunities Program
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Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
01-038-RI	Magnetic Resonance Imaging for the Assessment of Stroke and Other Neurological Disease	MRI techniques will play a critical role in understanding the evolution and treatment of strokes in humans. The goal of our proposal is to acquire the infrastructure needed to facilitate the development of a state-of-the-art MRI stroke research program a the U of A.	Christian Beaulieu	University of Alberta	$728,438	$355,000	Life Sciences
01-039-RI	Electrospray ionization - high field asymmetric waveform ion mobility spectrometry - tandem mass spectrometry (ESI-FAIMS-MS/MS)	ESI-FAIMS-MS/MS is a promising new technique for identification and characterization of polar compounds in complex matrices. The infrastructure will be used for human exposure research on disinfection by-products and metabolites, cyanobacterial toxins, gas/oil well flare emissions, and arsenosugars and metabolites in seafoods	Kenneth Froese	University of Alberta	$497,083	$197,614	Life Sciences/ Energy
01-053-RI	Cardiovascular Ion Channel Gene Therapy Unit (CIGNET)	CIGNET is a core molecular physiology facility dedicated to the study of the role of cardiovascular potassium channels in health and disease. Research will range from molecular biology to whole animal and human physiology. CIGNET will support translational research on common diseases (eg. Sudden Infant Death Syndrome and hypertension).	Evangelos Michelakis	University of Alberta	$806,498	$320,000	Life Sciences
01-056-RI	Biotelemetry analysis system: infrastructure for cumulative effects assessment	The infrastructure combines new space-based technology with sophisticated statistical computing and modeling to develop a powerful new tool for evaluating the cumulative effects of land-use development on wildlife populations. This new tool can be applied to a host of species and adapted to landscapes worldwide.	Mark Boyce	University of Alberta	$860,815	$200,000	Life Sciences

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01-060-RI	Infrastructure for deposition and characterization of combinatorial arrays of thin-film inorganic compounds and opto-electronic devices	Construction of a deposition system to define and control the composition and architecture of combinatorial arrays of inorganic thin films and thin film heterojunctions for photovoltaic applications. Optical and electron beam induced current (OBIC & EBIC) instruments will be constructed to provide a rapid screening technique.	Joel Haber	University of Alberta	$1,288,622	$540,000	Energy/ ICT
01-103-RI	Creation of a Multidisciplinary 3 Dimensional Morphometrics Centre	Infrastructure to create a multidisciplinary laboratory for 3 dimensional morphometics. Components include a Micro CT,Reflex microscope and facilities for image analysis. Facilities will be used by researchers across faculties at UofC & UofA.	Benedikt Hallgrimsson	University of Calgary	$802,952	$235,624	Life Sciences
01-112-RI	Advanced Space Instrument Facility (ASIF)	The facility consists of a combination of expertise and specialized equipment for the design, evaluation and operation of micro-satellites and satellites. The infrastructure was used to upgrade an existing U of C lab into a world-class space science facility. ASIF's design capability includes electro-optical detectors, optical instrumentation, and space plasma instruments.	Andrew Yau	University of Calgary	$605,505	$299,000	Other/ Multi-discipline
01-159-RI	Molecular Biology Infrastructure and Cell/Tissue Culture Facilities for Novel Biochemical Engineering Research	Will build on a proven track record in the biotechnology field and pursue innovative projects in upstream, process and downstream biochemistry engineering and will serve as a versatile and powerful analytical facility for other researchers.	Michael Kallos	University of Calgary	$522,427	$255,700	Life Sciences
02-081-RI	Plant Biotechnology Infrastructure: Applications of Molecular Biology and Gene Expression Assays	Develop a plant molecular biology laboratory. Key pieces of equipment include plant growth chambers, specialized camera systems, microscopes and specialized equipment to support molecular research approaches.	Olga Kovalchuk	University of Lethbridge	$433,234	$171,825	Life Sciences

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02-110-RI	2-Photon/Confocal Microscopy in Voltage-Clamped Respiratory Neurons	Infrastructure to understand perinatal respiratory network functions, sudden infant death syndrome and other life-threatening diseases associated with disturbed neuronal respiratory functions.	Klaus Ballanyi	University of Alberta	$1,387,403	$518,620	Life Sciences
02-111-RI	Centre for Symbolic Computation	Development of software for symbolic computation for use in applied mathematics and in high energy and condensed matter physics, computational fluid dynamics, and electrical and chemical engineering.	Andrzej Czarnecki	University of Alberta	$364,574	$133,835	ICT
02-112-RI	Development of a Core Facility for Spatial Applications of Social Ecology	Development of integrative models that involve both socio-economic and environmental variables for improved environmental and natural resource management planning.	Debra Davidson	University of Alberta	$505,400	$173,240	Life Sciences
02-113-RI	Laboratory for perceptual motor behaviour in Down syndrome and other special populations	A laboratory that is committed to the study of perception and human movement within special populations and across various levels of analysis.	Brian Maraj	University of Alberta	$359,086	$100,000	Life Sciences
02-114-RI	Electromagnetic Instrumentation for Studies of the Continents	Infrastructure for subsurface imaging techniques with natural electromagnetic signals for use in earthquake hazard research, tectonics studies, mineral exploration and environmental studies.	Martyn Unsworth	University of Alberta	$297,302	$118,423	Life Sciences/ Energy
02-115-RI	Establishment of a high-performance real-time digital signal, image and video processing laboratory	Creation of a low cost automated intelligent sensors network with research and development in real time digital signal processing, multimedia information appliance network, and systems identification and advanced control systems.	Wael Badawy	University of Calgary	$347,938	$131,870	ICT

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02-116-RI	Thermal Science Facilities	Experimental and computational facilities to perform research in the energy environment.	Abdulmajeed Mohamad	University of Calgary	$366,379	$144,340	Energy
02-117-RI	High-Field Magnetic Resonance Imaging for Vascular Diagnosis and Intervention	Clinical medical imaging research in the areas of whole body imaging and vascular imaging.	Richard Frayne	University of Calgary	$723,308	$220,000	Life Sciences
02-119-RI	Foothills Climate Array; Spatial Array of Meteorological Instruments to Study Mesoscale Climatological Processes, Precipitation and Temperature Variability, and Regional Climate Change	Study of regional weather variability and the underlying climatic processes to improve process parameterizations in models and provide insight 'downscaling' of climate model predictions to the scales of impact for human development and the environment.	Shawn Marshall	University of Calgary	$632,960	$234,002	Life Sciences/ Energy
02-120-RI	The Experimental Economics Laboratory at the University of Calgary	A facility for innovative research on decision-making and market institutions with direct relevance to economic and social policy.	Robert Oxoby	University of Calgary	$418,962	$160,490	Other/ Multi-discipline
03-010-SRI	Equipment for Field Studies of Competition Ecology and Stand Dynamics in Western Boreal Forests	Development of the Mixedwood Growth and yield Models (MGM) and evaluation of the growth and yield implications of different silvicultural and management systems for Alberta's forests.	Philip Comeau	University of Alberta	$334,476	$100,343	Life Sciences

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03-011-SRI	Chemical and Biological Nanotechnology	Developing nanotechnological techniques which will use pathogens such as viruses to map the surface of human cells with nanometer resolution and, in turn, aid in the development of new drug therapies to combat infections.	John-Bruce Green	University of Alberta	$1,159,096	$345,314	Life Sciences
03-012-SRI	Infrastructure for Flow-Surface Interaction Laboratory	Infrastructure to support research in fluid mechanics, turbulence, and combustion with research projects related to oil and gas production and refining, industrial and residential furnaces, as well as IC engines and gas turbines.	Brian Fleck	University of Alberta	$558,472	$166,861	Energy
03-014-SRI	Protein production and crystallization facility for structural biology research	Protein crystallography poses challenges because proteins are unstable, soft molecules and require perfect conditions to crystallize. Hundreds of crystals are created with the help of a robot in the hope of finding perfect crystals that will reveal protein structures.	Bart Hazes	University of Alberta	$684,988	$213,563	Life Sciences
03-015-SRI	Infrastructure for Establishing an Information Research Laboratory	Dr. Li's research interests are statistical genetics and genomics. In particular he is developing statistical methods to find genes responsible for complex human diseases, using either family or population based approaches. The laboratory is also used for statistical computing and modeling of reaction diffusion systems that arise in biological models.	Michael Li	University of Alberta	$350,000	$105,000	Life Sciences
03-016-SRI	Manufacturing, Modeling and Control of Solid Oxide Fuel Cells	This research will concentrate on fundamental dynamic modeling with the objective of determining optimal designs and operating profiles. As electric vehicle power sources, the dynamic behavior of the batteries or fuel cells sets the limits on achievable performance.	Jingli Luo	University of Alberta	$706,542	$211,963	Energy

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03-017-SRI	Microinterfacial and Micromechanical Facilities	The infrastructure will support colloidal and interfacial science in general, and small scale interfacial phenomena or microinterfacial phenomena in particular. Here, "small scale" implies dimensions on the order of one to ten micrometers. Many important systems in industrial and biological applications appear in the form of liquid-liquid dispersions, i.e., the dispersion of micrometer-sized liquid drops in a distinct (often immiscible) liquid.	Anthony Yeung	University of Alberta	$318,906	$95,407	Life Sciences/ Energy
03-018-SRI	Laboratory for visualization, monitoring and human interaction with intelligent machines and robots	Infrastructure to support work related to the areas of machine and biological vision, pattern recognition, robotics, and artificial intelligence. A human can easily pick up a visible object, and can even watch a whole task, learn, and transform the visual information into the necessary motor (muscle) movements to carry out the task.	Martin Jagersand	University of Alberta	$750,000	$210,000	ICT
03-019-SRI	Single cylinder engine testbed facility for innovative internal combustion engine research	Infrastructure to study the behaviour of internal combustion engines and fluid systems and the application of control to these systems. Homogeneous Charge Compression Ignition (HCCI) is a promising new combustion concept for internal combustion engines in which a homogeneous air-fuel mixture auto-ignites without a spark.	Charles Koch	University of Alberta	$602,686	$180,806	Energy
03-020-SRI	Laboratory facility for biogeochemical studies of soil organic matter	Infrastructure to investigate the main components of the soil biota; the metabolic and molecular diversity of microbial populations and their role in soil processes; the microbiology and biochemistry of decomposition of organic matter in soil; kinetics of organic matter turnover; biogeochemical cycling of N, P, S, Si, base cations and metals; and the application of soil microbiology to selected environmental problems.	Sylvie Quideau	University of Alberta	$488,045	$146,414	Life Sciences
03-021-SRI	Laboratory for the Design, Modeling, and Nonlinear Control of a Self-Bearing Motor	Infrastructure to investigate the modeling and control of a related system called the self-bearing motor (SBM) (sometimes also called a bearingless motor or integrated motor-bearing). The SBM is an emerging technology which has evolved from traditional active magnetic bearings (AMB) and electric motors.	Alan Lynch	University of Alberta	$552,698	$165,809	Energy

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03-022-SRI	Infrastructure for Fundamental Heterogeneous Catalyst Research	The surface chemistry of a catalyst is studied to predict the activity and selectivity for a variety of applications in the chemical process industry. This infrastructure will be used to investigate the surface chemistry of model heterogeneous catalysts for the petroleum and energy sectors, including bitumen upgrading and hydro treating, and direct oxidation solid-oxide fuel cell development.	Alan Nelson	University of Alberta	$485,311	$145,560	Energy
03-023-SRI	Novel approaches to better understanding forest soil processes and their implications for forest productivity and global change	Infrastructure to investigate forest soil processes, soil microbial ecology, forest fertilization, tree nutrition, and silviculture-soil management interactions.	Scott Chang	University of Alberta	$521,349	$155,658	Life Sciences
03-024-SRI	Molecular physiological analysis of voltage-clamped respiratory neurons	Infrastructure to understand basic mechanisms of neuronal information processing within respiratory networks. The lab is trying to understand how neurons and networks of neurons in the brainstem and spinal cord produce a breathing rhythm that is not only reliable and robust, but is also very dynamic.	Gregory Funk	University of Alberta	$1,075,242	$280,792	Life Sciences
03-025-SRI	Development of a Wireless Network Testbed	Infrastructure to enhance user experience of wireless services and applications through research and development of innovative wireless networking protocols. Wireless provides flexibility and enables anytime, anywhere communications. Applications of wireless communications range from high power mobile cellular systems to low power personal area networks (e.g., Bluetooth-based networks).	Abraham Fapojuwo	University of Calgary	$567,357	$150,000	ICT
03-026-SRI	Laboratory of Human Cerebrovascular Physiology	Infrastructure to better understand the physiological mechanisms that underlie the regulation of cerebral blood flow (CBF) by oxygen and carbon dioxide in young healthy humans, and to investigate the age-related alterations in this regulation.	Marc Poulin	University of Calgary	$913,855	$219,002	Life Sciences

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
03-027-SRI	Development of Microarray Systems Using an Archaebacterial Model	Development of a software package called Osprey for the calculation of optimal oligonucleotides for DNA sequencing and the creation of microarrays based on either PCR-products or directly spotted oligomers. It incorporates a novel use of position-specific scoring matrices, for the sensitive and specific identification of secondary binding sites anywhere in the target sequence.	Christoph Sensen	University of Calgary	$270,158	$80,083	Life Sciences
03-028-SRI	Instrumentation for Ultra Precision Dynamic Identification, Optimization and Prototyping of Microsystems Technology and Nanotechnology Based Devices	Work in the area of noninvasive precision metrology, providing a foundation for the development of advanced sensing and estimation techniques applicable in ultraprecision machine tools, microelectromechanical systems (MEMS), microtechnology based energy and chemical systems (MECS), and nanoscale devices.	Slawomir Spiewak	University of Calgary	$354,212	$105,480	ICT
03-029-SRI	A Microscopy System to Measure Vascular Communication	Infrastructure to study the nature of electrical and diffusional communication between smooth muscle and/or endothelial cells. Cell-to-cell communication is central to blood flow control and this process is enabled by intercellular ion channels called gap junctions. Work with cell-to-cell communication involves a combination of experimental techniques and mathematical modeling.	Donald Welsh	University of Calgary	$446,962	$133,231	Life Sciences
03-030-SRI	*In-vivo* high resolution computed tomography centre for bone and joint injury research	Develop quantitative noninvasive methodologies to understand the etiology of musculoskeletal diseases and injuries, and to use that information for the development of improved treatment strategies. An important tool for much of their research, high resolution computed tomography (micro-CT) is a non-destructive method to image complex 3D structures.	Steven Boyd	University of Calgary	$625,196	$164,055	Life Sciences
03-033-SRI	Creation of Biometric Technologies Laboratory	The laboratory emphasizes on modeling and generation of synthetic biometric information, and on testing the biometric devices and systems. The lab focuses on synthesizing biometric data – for example, modeling fingerprint and signature forgeries as well as aging or surgically changed faces - which are then used for testing biometric systems.	Svetlana Yanushkevich	University of Calgary	$488,374	$139,295	Life Sciences/ ICT

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03-035-SRI	Research infrastructure for asymmetric catalysis and supramolecular chemistry	The infrastructure will support developing catalysts to assist in the design of pharmaceutical products; understanding basic metabolism processes in plants, so we can learn more about how plants respond to stresses like drought and climate change; eliminating impurities that have environmental impact from industrial processes in the pulp and paper and fertilizer industries; and characterizing medicinal plants in East Africa.	Grace Greidanus-Strom	King's University College	$123,479	$36,530	Life Sciences
05-010-SRI	ODEPR System for Novel Studies of Semiconducting Materials	The Optical Detection of Electron Paramagnetic Resonance (ODEPR) equipment is located in the Magneto-Optical Spectroscopy laboratory in the U of A Physics Department. One of the primary research interests of the group is the study of the fascinating physics of bulk and nano-scale semiconductor structures and devices.	Kim Chow	University of Alberta	$542,187	$102,534	ICT
05-011-SRI	Nano-Designed Materials through Structural Chemistry	The research program is focused upon synthesis, characterization and application of small molecule precursors suitable for fabrication of monodispersed nanoparticles via solution borne chemistry. The resulting materials are suitable for a wide scope of applications including: DNA testing, organic light-emitting diodes (OLEDs), lasers, catalysis, nanoelectronics, and optoelectronics.	Jonathan Veinot	University of Alberta	$362,046	$91,218	Life Sciences/ Energy/ ICT
05-012-SRI	Development of a Real-Time Digital Simulation and Control Laboratory for Innovative Research in Power Engineering	New technologies based on sophisticated power electronic apparatus and their digital control systems are finding increasing applications in electric power systems at generation, transmission, distribution, and utilization levels. It is essential to carry out rigorous performance evaluation of the power electronic equipment and their digital controllers prior to their commissioning on the host power system.	Venkata Dinavahi	University of Alberta	$500,857	$148,709	Energy/ ICT

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05-013-SRI	Proteomic analysis of the cardiovascular system in hypertension	Infrastructure to develop a systems biological approach to the study of hypertension. The systems biological approach employs proteomics and computation as well as integrative physiology and pharmacology. The lab is testing the hypothesis that hypertension could result from the perturbation of just a few, yet fundamental, mechanisms of vasoregulation.	Carlos Fernandez-Patron	University of Alberta	$441,431	$132,429	Life Sciences
05-014-SRI	Nanoscale Functionalization of Semiconductor Surfaces	Infrastructure for unique, unpredictable and highly intriguing physical, optical and electrical phenomena which result from the confinement of matter into nanoscale features. Much of the driving force for building tiny devices and features on the nanoscale is their importance for existing and emerging technologies such as microelectronics, nano-electromechanical systems (NEMS), sensors and diagnostics which communicate directly with cells, viruses and bacteria, quantum confinement effects, and a host of other applications.	Jillian Buriak	University of Alberta	$707,130	$238,320	Life Sciences/ Energy/ ICT
05-015-SRI	Proteomics Tools for Plant Research	Microarrays are a new technology for measuring the levels of activity for thousands of genes at once. The group is also studying the process of tracheary element (wood) differentiation, and the structure and function of introns. This involves techniques of genetics, bioinformatics, and molecular biology, including high-throughput technologies such as DNA microarrays.	Michael Deyholos	University of Alberta	$760,878	$228,263	Life Sciences
05-016-SRI	Infrastructure for Establishing a Communications Research Laboratory (CRL)	Infrastructure supports the fundamental theoretical research on space-time coded multicarrier modulation and ultra-wideband impulse radio, as well as the practical simulation, experiment and implementation of these cutting-edge technologies. The research will address critical physical layer issues in the development of future generation high data rate mobile communications and high speed wireless personal area networks.	Chintha Tellambura	University of Alberta	$372,908	$135,143	ICT

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05-017-SRI	Reconfigurable Testbed for High Performance Parallel Data Mining	Infrastructure to support research interests in computational intelligence (especially fuzzy logic and granular computing), data mining, and their application to software testing and epidemiology.	Scott Dick	University of Alberta	$744,133	$250,000	ICT
05-018-SRI	*In vivo* imaging system for assessing intestinal microvasculature during inflammation	The infiltration of white blood cells into tissue is a key factor in the development of gastrointestinal inflammation. Dr. McCafferty's laboratory investigates the role of white blood cells in causing macroscopic/histological and epithelial permeability changes in various inflammatory models eg. in response to bacterial products (LPS) and in experimental models of colitis.	Donna-Marie McCafferty	University of Calgary	$258,693	$69,134	Life Sciences
05-019-SRI	Laboratory for Environmental Catalytic Applications	Dr. Josephine Hill (Faculty of Engineering) is researching catalyst applications for fuel cells and heavy oil processing. Currently most fuel cells operate with hydrogen as the fuel. Hill's research team is developing fuel cells that can use hydrocarbons, such as methane from natural gas, or alcohols, derived from biomass, directly as fuels in order to reduce emissions.	Josephine Hill	University of Calgary	$521,905	$141,000	Energy
05-020-SRI	Tools for applied electromagnetics research	Infrastructure to support research in the area of computational electromagnetics, and their application to problems in the realms of electrical engineering, optical engineering, and bioelectromagnetics. The electrical and computer engineering professors are studying the interaction of electromagnetic fields and living biological systems. Specifically, the researchers are exploring a new approach for breast cancer detection called tissue sensing adaptive radar (TSAR).	Elise Fear	University of Calgary	$647,214	$265,127	Life Sciences/ ICT

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05-021-SRI	Establishment of Environmental / Bio-XAS Centre	Infrastructure to support speciation and structural determination of metal complexes using synchrotron based X-ray Absorption Spectroscopy (XAS). This synchrotron-based method can be used to identify the structures and properties of molecules, including those within potentially toxic and environmentally harmful heavy metals such as lead and mercury.	Farideh Jalilehvand	University of Calgary	$628,085	$183,809	Life Sciences/ ICT
05-022-SRI	Applications of Main Group Inorganic Frameworks in Catalysis and the Material Sciences: State-of-the-Art Synthetic Laboratory	Infrastructure to support research in synthetic inorganic chemistry, with emphasis on the chemistry of the main group elements other than carbon, as well as combinations of these elements with transition metals. The goals are both the development of new molecular materials and the characterization of novel bonding patterns for the main group elements.	Roland Roesler	University of Calgary	$314,462	$85,339	Other/ Multi-discipline
05-024-SRI	Functional and Neurochemical Correlates of the Pathology of Parkinson's Disease	Infrastructure to investigate physiological and environmental aspects in the pathology of Parkinson's disease, a disorder of the central nervous system mainly affecting motor function. The factors and mechanisms that lead to onset and progression of the motor symptoms of Parkinson's disease are still not clearly understood. Dr. Metz's research investigates some of these factors by using detailed behavioural analysis in rodent models, and evaluating the benefit of potential therapeutic interventions.	Gerlinde Metz	University of Lethbridge	$314,328	$47,450	Life Sciences
05-025-SRI	Accessibility to Education Using Learning Objects: Implementing the semantic web with advanced development & testing of applications	Infrastructure to advance the development of innovative e-learning technologies, specifically to create a testbed of linked and interoperable learning object repositories. A repository addresses the problem of finding high-quality and appropriate learning materials using standard web searches by providing educators and learners with information that is structured and organized to facilitate searching, storing, and using learning materials regardless of their source location.	Rory McGreal	Athabasca University	$592,794	$215,175	ICT

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05-026-SRI	Molecular insights into the regulation and recovery of cytosolic calcium during cardiac muscle relaxation.	Infrastructure to support research in membrane proteins involved in calcium ion metabolism in the myocardium. Dr. Young uses electron cryomicroscopy to determine the structure of cardiac membrane calcium transport proteins, such as the sarcoplasmic reticulum Ca2+-ATPase and phospholamban.	Howard S. Young	University of Alberta	$499,032	$130,007	Life Sciences
05-027-SRI	Neurophysiology laboratory to study and restore human limb movement	The laboratory will focus on research divided into two main categories: how sensory feedback contributes to movement control, including the role of reflexes in neural control of movements such as walking and grasping and the importance of feedback from sensory receptors in the skin, and how intrinsic properties of neurons within the spinal cord play a role in helping to shape motor output.	David Collins	University of Alberta	$205,423	$60,969	Life Sciences
05-028-SRI	Functional analysis of the mitotic checkpoint using live cell time-lapse confocal microscopy	Infrastructure to support research to understand the molecular mechanisms of mitotic checkpoint control in mammalian cells. By investigating the molecular mechanism of the mitotic checkpoint, Dr. Chan's research group can better evaluate these genes as potential cancer drug targets as well as contributing to the basic understanding of cancer.	Gordon Chan	University of Alberta	$670,498	$149,192	Life Sciences
05-029-SRI	Equipment for Analog and Mixed-Signal Testing of High-Speed Communications Integrated Circuits	Infrastructure to support research in data transfer codes and protocols. Turbo and LDPC codes are now used in cell phones in order to allow us to send and receive information such as pictures. Future applications such as video-on-demand will require even more sophisticated coding schemes and computational technologies. One such innovation, called an analog decoder, could potentially extend battery life in cell phones by a factor of 10.	Vincent Gaudet	University of Alberta	$376,394	$128,037	ICT

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05-032-SRI	Real-time, live-cell imaging of mRNA localization in epithelial cells	Infrastructure to study RNA in fruit fly epithelial cells. RNA, or ribonucleic acid have often been thought of as simply passive messengers transmitting genetic information from the DNA in the nucleus to the cytoplasm and synthesizing proteins. But the new picture, which has come sharply into focus as the result of Dr. Simmond's work, shows the small RNAs at the helm of many of the cell's genetic workings.	Andrew Simmonds	University of Alberta	$610,361	$164,132	Life Sciences
05-033-SRI	Molecular analysis of *Helicobacter pylori:* the cag-pathogenicity island and associated signaling pathways	Research to understand the complex interactions between the human pathogen *Helicobacter pylori* and the eukaryotic cells. *Helicobacter pylori* is associated with the development of several gastric diseases including peptic ulcer disease (PUD), MALT-lymphoma and adenocarcinoma. The research will broaden our understanding of the molecular basis of gastric diseases triggered by *H. pylori,* and may result in the identification of novel targets for drug development.	Markus Stein	University of Alberta	$525,710	$129,700	Life Sciences
05-034-SRI	Experimental Lung Development and Therapy Core	Infrastructure to support translational research on neonatal cardiopulmonary diseases, including bronchopulmonary dysplasia (BPD) and congenital diaphragmatic hernia (CDH). Dr. Thébaud studies the role of angiogenic growth factors, elastin protecting agents and stem cells to protect/regenerate oxygen-injured lungs in newborn rodents. Dr. Thébaud also explores the mechanisms underlying neonatal pulmonary hypertension in animal models of CDH.	Bernard Thebaud	University of Alberta	$273,723	$77,412	Life Sciences
05-035-SRI	Scanning microscopy and vibrational spectroscopy for molecular device research	Infrastructure to support research in composite materials. To approach these goals, the group uses tools to probe and manipulate matter at the nano-scale.	Robert Wolkow	University of Alberta	$658,899	$181,500	Life Sciences/ Energy/ ICT

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05-038-SRI	Infrastructure for Advanced Materials Research in Medical Applications	Infrastructure to support research in tissue mechanics research, and biomechanical engineering research. To approach these goals, the group uses tools to probe and manipulate matter at the nano-scale.	Jason Carey	University of Alberta	$131,093	$53,236	Life Sciences/ Energy
05-039-SRI	An interdisciplinary program in carbohydrate, medicinal, and computational chemistry	Infrastructure to support research focused in the areas of synthetic chemistry (with a particular emphasis in carbohydrate chemistry), the conformational analysis of oligosaccharides and the design of novel therapeutic agents that act by inhibiting carbohydrate-processing enzymes. The primary research focus is directed ultimately towards the identification of new drugs for the treatment of tuberculosis.	Todd Lowary	University of Alberta	$338,356	$101,356	Life Sciences
05-041-SRI	Development of a biocatalytic suite for the processing of value-added agricultural commodities	Infrastructure to support research in the industrial application of chemical and biological systems for the catalytic conversion of conventional agricultural products to value-added commodities. Much of the biological work involves production, modification, purification, and design of biocatalytic systems.	David Bressler	University of Alberta	$416,236	$100,222	Life Sciences/ Energy
05-042-SRI	Imaging Laboratory for Functional Recovery	Infrastructure to support the Seaman Family Research Centre's 3 Tesla magnetic resonance imaging (MRI) technology to prevent, diagnose and treat stroke. The goal is to find new and better ways to display the damaging effects of stroke and quantify the treatment being provided.	Bradley Goodyear	University of Calgary	$602,016	$147,000	Life Sciences
05-043-SRI	Protein crystallization, macromolecular interaction and drug design infrastructure	Infrastructure to support research in understanding how biological macromolecules function at the molecular level. Dr. Ng's lab is particularly interested in understanding how the three-dimensional structures of proteins have evolved to act as highly specific and efficient chemical catalysts (enzymes) or binding proteins.	Kenneth Ng	University of Calgary	$690,349	$115,301	Life Sciences

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05-046-SRI	Facility for the Spectroscopic Studies of Radical Intermediates Formed in the Hot Wire Chemical Vapor Deposition of Semiconductor Thin Films	Infrastructure to investigate the structures, energetics and dynamics of radicals and intermediates formed in the processes of Hot Wire Chemical Vapor Deposition (HW-CVD) of semiconductor thin films. HW-CVD is a new technology to produce device quality silicon-based thin films, which are found to have large potential in low-cost optoelectronic devices (e.g. solar cells) and thin film transistors.	Yujun Shi	University of Calgary	$770,098	$185,000	Energy/ ICT
06-001-SEG	Remote Monitoring System for Monitoring Numerical and Functional Responses of Wildlife in Dynamic Landscapes	To understand how alterations of natural landscapes by energy sector development interacts with climate change to influence ecosystems, information linking behaviour of animals to population processes is needed. Developments in remote wildlife monitoring will allow us to make innovative advances that will help Alberta grow sustainably.	Erin Bayne	University of Alberta	$253,824	$58,331	Life Sciences/ Energy
06-002-SEG	Ecological Genomics Laboratory	This funding is for a DNA-typing facility to study genetic structure, pedigree analysis, molecular systematics and gene mapping in wildlife using automated DNA analysis and high-throughput sample handling. The Ecological Genomics Laboratory (EGL) will consist of a wet lab and a separate high-throughput automated DNA fragment analysis suite.	David Coltman	University of Alberta	$436,502	$100,000	Life Sciences
06-004-SEG	Development of a Porcine Gamete and Embryo Evaluation/ Manipulation Facility	The infrastructure proposed would establish a state-of-the-art reproductive technology facility at the University of Alberta (U of A) Swine Research and Technology Centre (SRTC). Reproductive technologies in livestock represent an efficient means for disseminating genetic resources.	Michael Dyck	University of Alberta	$390,719	$110,000	Life Sciences
06-005-SEG	Self-Assembled Nanostructured Organic Materials	This proposal makes the case for the acquisition of a state-of-the-art 500 Mhz nuclear magnetic resonance (NMR) spectrometer for the investigation of the 3D structure, dynamics, and quality control of organic molecules, materials, polymers, and macromolecular systems used in nanoscale science and engineering, and nanomedicine.	Hicham Fenniri	University of Alberta	$1,276,040	$299,056	Life Sciences/ Energy/ ICT

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06-008-SEG	Combined Pulsed Laser Deposition - Sputter System for Synthesis of Multiphase Nano-structured Materials and Micro-Devices	Infrastructure for advanced thin-film deposition techniques to synthesize metal-based three-dimensional nanostructured composites for MEMS applications, and the first true on-chip solid oxide fuel cell (SOFC) with tunable dimensions.	David Mitlin	University of Alberta	$900,000	$270,000	Energy/ ICT
06-013-SEG	Infrastructure for Plant Pathology and Breeding Research	Infrastructure to understand plant pathogen virulence and host resistance. This knowledge will be applied to the development of canola germplasm with improved disease resistance. Research will also aim to produce numerous value-added nutraceutic compounds in canola and to broaden genetic diversity of the crop.	Stephen Strelkov	University of Alberta	$739,937	$175,000	Life Sciences
06-014-SEG	Development of Cardiovascular Magnetic Resonance Imaging	Magnetic resonance imaging (MRI) is a noninvasive diagnostic imaging modality that yields anatomic and functional images of the beating heart, providing a one-stop shop for diagnosis of heart disease. New designer radio frequency receiver coils (MRI hardware component) will be used to increase the sensitivity of cardiac MRI and provide significantly faster imaging than is currently available.	Richard Thompson	University of Alberta	$120,044	$36,013	Life Sciences
06-015-SEG	Building a pediatric N-of-1 research service	This project is focused on enabling the development of a first class research facility that will allow for product based clinical research in the area of pediatric medicine and natural health products. In particular, the equipment requested will enable the development of a pediatric N-of-1 service that specializes in NHP evaluation.	Sunita Vohra	University of Alberta	$300,786	$90,236	Life Sciences
06-016-SEG	Infrastructure for the Study of Gut Microbial Communities	In vitro continuous culture simulations of the gastrointestinal microflora, in combination with molecular and cell biology techniques, will be used to analyze the role of gut microbial structure and function on the aetiology of Inflammatory Bowel Disease (IBD).	Kevin Rioux	University of Calgary	$493,838	$148,149	Life Sciences

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06-020-SEG	A Molecular Biology Laboratory to Study HIV and WNV Pathogenesis	To establish infrastructure to study the molecular mechanisms underlying the pathogenesis of both Human Immunodeficiency virus and West Nile virus. In addition, therapeutic strategies for West Nile virus-induced neurological disease will be explored, and antiviral drug resistance of the Human Immunodeficiency virus will be studied.	Guido van Marle	University of Calgary	$214,711	$64,413	Life Sciences
06-022-SEG	Centre for Integrative Chronobiology	This grant will help establish novel and fundamental infrastructure necessary to study the inner-workings of the mammalian circadian system at the behavioural, anatomical and molecular levels, with the ultimate goal of developing pharmacological or behavioural interventions for sleep and circadian disorders.	Michael Antle	University of Calgary	$197,358	$59,207	Life Sciences
06-023-SEG	Canadian Satellite Altimetry Database & Processing System (CADS)	It is proposed to develop a satellite altimetry database system with user-specific product generation and on-line dissemination to support research and engineering in climate change, sea level change, surface water and hydrology, and surface deformation. The infrastructure consists of computer hardware and in-house developed software.	Alexander Braun	University of Calgary	$547,463	$146,250	Life Sciences/ Energy/ ICT
06-025-SEG	Generation of a *C. elegans* Facility to Study the Control of Stem Cell Proliferation	Dividing stem cells have the ability to either remain a stem cell or to differentiate into a specific cell type. The proposed infrastructure will be used to identify and characterize new factors that are involved in regulating this decision using the *C. elegans* germ line as a model.	David Hansen	University of Calgary	$383,516	$53,601	Life Sciences
06-027-SEG	Establishment of a Tissue and Cellular Engineering Research Facility	This project will establish infrastructure at the University of Calgary to support tissue and cellular engineering research efforts. This research will be conducted by two new faculty members (C. Hunter and K. Rinker), and will also be used to recruit up to three new faculty to the Centre for Bioengineering Research and Education.	Christopher Hunter	University of Calgary	$342,104	$102,631	Life Sciences

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06-028-SEG	A Cell Biology Laboratory (CBL) for the Institute of Biocomplexity and Informatics (IBI)	This application will result in the establishment of a Cell Biology Laboratory (CBL) for systems biology-biocomplexity research, headed by Dr. Stuart Kauffman (IBI's Director) at the University of Calgary. The CBL will support extensive research, collaborations, training and technology transfer activities.	Stuart A. Kauffman	University of Calgary	$1,775,768	$532,730	Life Sciences
06-030-SEG	Research Tools for Cardiac Electro-physiology	The purpose of this application is to develop a research lab specializing in cardiac electrophysiology for Dr. Nygren and his students. Two experimental setups are requested: one for measurements at the tissue level, and one for measurements at the cellular level.	Anders Nygren	University of Calgary	$444,390	$100,000	Life Sciences
06-032-SEG	Confocal Imaging System for the Analysis and Optimization of Engineered Tissues Generated from Mammalian Stem Cells for Therapeutic Applications	A confocal imaging system is requested to characterize and model cultured stem cells, and the tissues generated from them. The proposed infrastructure will greatly facilitate the development of protocols aimed at scaling-up stem cell/tissue production for clinical applications such as the treatment of Parkinson's disease and diabetes.	Arindom Sen	University of Calgary	$789,519	$236,856	Life Sciences
06-034-SEG	Research Facility for Laboratory Spectroscopy of Terrestrial and Outer Planetary Molecules	An ultra-high resolution laboratory for molecular spectroscopy studies of atmospheric constituents. The research will develop spectroscopic tools needed to study molecules of environmental interest and interpret remote sensing data.	Adriana Predoi-Cross	University of Lethbridge	$295,072	$88,521	Life Sciences/ Energy

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06-036-SEG	Ultra-Trace Clean-Laboratory for Environmental and Human Health Sciences Research on Emerging Organic Contaminants	The new infrastructure will enable a broad range of new studies relating to the fate of chemicals in the environment, their exposure pathways, and their possible effects on health.	Jonathan W Martin	University of Alberta	$819,602	$183,586	Life Sciences
06-039-SEG	Project planSys: 3-D VR Planning System for Surgical Treatment of Lung Cancer	The project focuses on the research and development of planSys - a three-dimensional (3-D) surgical planning system for treating lung cancer - by using the advanced technologies of virtual reality (VR).	Yaoping Hu	University of Calgary	$441,220	$132,366	Life Sciences
06-040-SEG	Supramolecular Interfaces Research Facility (SIRF)	Research laboratory to study novel approaches to solar cells. The research investigates synthetic organic approaches to create self-assembling surface components, based on photosynthetic reaction centres, to create functional photovoltaic devices.	Todd C. Sutherland	University of Calgary	$431,827	$129,548	Energy
06-041-SEG	Laboratory for Advanced Materials Science - Fuel Cells, Sensors and Batteries (LAMS-FSB)	The state-of-the-art equipment for the investigation of materials for solid oxide fuel cells, proton exchange membrane fuel cells, sensors and batteries.	Venkataraman Thangadurai	University of Calgary	$662,612	$198,784	Energy
06-043-SEG **Project Cancelled*	Cell Culture and Molecular Virology Infrastructure for Development and Enhancement of Baculovirus-based Technologies	Development of baculovirus-based platform technology for protein and vaccine production using insect bioreactors and targeted gene delivery in mammals by engineering baculovirus surface proteins.	Oliver Lung	University of Lethbridge	$360,757	$108,277	Life Sciences

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07-001-SEG	Fabrication and Testing Facilities for Carbon Nanotube-based Devices and Circuits	Dr. Chen will purchase equipment that will allow him to build accurate and sensitive carbon nanotube-based devices and circuits with carbon nanotubes a very promising and tiny building material. The carbon nanotube structures could be of benefit in biomedical areas such as in the development of small yet robust and sensitive devices for diagnosis and treatment of diseases such as cancer. Carbon nanotube circuits could bring energy savings to consumer electronics and could replace the silicon processing chip in computers.	Jie Chen	University of Alberta	$560,232	$168,070	Other/ Multi-discipline
07-002-SEG	Novel Reservoir Simulation Using Parallel and Hardware Acceleration	Dr. Gates' award will fund the development of a next-generation reservoir simulator that will evaluate oil and gas resources and determine more efficient ways to develop, maintain, and produce a given reservoir. His new approach to reservoir simulation would incorporate more chemical and physical factors and use more computing power. Dr. Gates' reservoir simulator will be the first of its kind in Canada.	Ian D. Gates	University of Calgary	$601,512	$168,983	Energy
07-004-SEG	Tools for Molecular Simulations of Crystal Growth	Dr. Kusalik will establish a computational laboratory to simulate crystal growth, an area of research with many applications. For example, fundamental knowledge about the formation and dissolution of crystals could have industrial applications in several energy-related sectors, including methane recovery, carbon dioxide sequestration and flow assurance in pipeline networks. Dr. Kusalik will also investigate basic questions about ice crystal growth to improve understanding of atmospheric processes, make better climate models and improve weather forecasting.	Peter Kusalik	University of Calgary	$1,182,327	$250,000	Other/ Multi-discipline
07-005-SEG	Quantum Cryptography and Communication Laboratory (QC2Lab)	Dr. Tittel will purchase equipment to develop a more secure Alberta-wide communication network through the use of quantum cryptography. Quantum cryptography offers security which is guaranteed by the laws of nature, meaning this security cannot be compromised by new technologies. By establishing a quantum cryptography and communication laboratory, the University of Calgary positions itself to become a world leader in information security.	Wolfgang Tittel	University of Calgary	$2,092,147	$627,644	ICT

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07-006-SEG	Development of a yeast facility for the study of lipid metabolism and lipid mediating signalling	Dr. Zaremberg will purchase specialized equipment to help in the study of natural fats, or lipids, and their role in healthy and diseased cells. This basic research may have important consequences in biomedical research pertaining to drug development and treatment of lipid-related diseases.	Vanina Zaremberg	University of Calgary	$206,291	$61,888	Life Sciences
07-008-SEG	Laboratory for the Synthesis and Characterization of Phosphaorganic and Organometallic Materials for Molecular Electronics, Optoelectronics and Catalysis	Dr. Baumgartner experiments with using organic compounds to build molecular electronic devices that can be used for applications such as light-emitting diodes (LEDs). The SEG award will be used to purchase specialized equipment which will allow Dr. Baumgartner to investigate new compounds for electronics applications.	Thomas Baumgartner	University of Calgary	$277,069	$83,121	Other/ Multi-discipline
07-009-SEG	Measuring Communication between the Endoplasmic Reticulum (ER) and Mitochondria with Novel Fluorescent Probes in Live Cells	The project aims to observe the communication between two intracellular organelles, the endoplasmic reticulum and mitochondria, *in vivo*. This communication is a major determinant of cellular fate and often malfunctions in cancer tissue or upon neurodegeneration.	Thomas Simmen	University of Alberta	$674,024	$202,207	Life Sciences
07-011-SEG	A Glycoengineering Laboratory	Dr. Feldman will purchase dedicated lab equipment to investigate new treatments for autoimmune diseases and cancer by using bacteria to make the active components. Dr. Feldman is a member of the Alberta Ingenuity Centre for Carbohydrate Science (AICCS) where his research group's work complements and extends the applications of Alberta's internationally recognized team of carbohydrate researchers.	Mario Feldman	University of Alberta	$425,741	$127,722	Life Sciences
07-012-SEG	Establishment of a Facility for Molecular and Cellular Analysis in Pharmacy and Pharmaceutical Sciences	Dr. Seubert's SEG award will be used to purchase dedicated lab equipment for the investigation of the cardioprotective characteristics of naturally occurring compounds, with the aim of protecting the heart from stress related injury and developing new treatments for heart disease.	John Seubert	University of Alberta	$394,786	$118,442	Life Sciences

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07-015-SEG	Hybrid Device Facility for Molecular Electronics	Dr. McCreery will develop a facility within the National Institute for Nanotechnology that will accommodate the unique requirements for making and studying molecular electronics, which is when molecules are used as circuit components within electronic devices. The hybrid device facility will be used as the core of Dr. McCreery's research group's needs, but will also be available to other researchers, becoming an important asset of the whole nanotechnology base being built in Alberta.	Richard McCreery	University of Alberta	$874,160	$262,248	Other/ Multi-discipline
07-017-SEG	Environmental Stress and Hydraulic Limits on Tree Performance: The Ecophysiology of Adaptation to Stress	Dr. Tyree will purchase equipment to study cold and drought stresses in an important Alberta tree species, the poplar. By identifying the characteristics in a tree which make it particularly well adapted to stress, Dr. Tyree will give the forestry industry important information to use in tree-improvement breeding programs.	Melvin T Tyree	University of Alberta	$537,604	$161,281	Life Sciences
07-018-SEG	Single Molecule Fluorescence Laboratory for Probing Plasma Membrane Enzymology in Single Cells Using Chemical and Spectroscopic Tools	Dr. Cairo will use the SEGP award to establish a specialized laboratory that is able to observe the movement of individual molecules within a living cell. Dr. Cairo intends to develop new fluorescence tags for components of the living cell so that we may discover more about its dynamics. Researchers trained in Dr. Cairo's program will become valuable assets in Alberta's life sciences sector, as the technology is used in pharmaceutical research, development of new diagnostics for disease, and the chemical industry.	Christopher W Cairo	University of Alberta	$619,588	$185,876	Life Sciences
08-001-SEG	Women and Exercise: Infrastructure for Understanding a Complex, Integrative Physiology	Dr. Billaut's research addresses the question of sex differences in skeletal muscle fatigue. The neuromuscular and metabolic functions will be originally studied, and the role of a revolutionary model of muscle fatigue will be envisaged. His multi-disciplinary investigations will provide crucial information on the female physiology to enhance health and sport performance.	Francois Billaut	University of Lethbridge	$289,032	$86,710	Life Sciences

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08-002-SEG	Infrastructure for Molecular Evolutionary Ecology Laboratory	New equipment to examine genetic changes in Alberta's bird populations, and using this information to discover how bird populations respond to changes in their environment. Government and industry can use the information to develop policies to support sustainable development and to protect wildlife in Alberta.	Theresa Burg	University of Lethbridge	$197,928	$59,378	Life Sciences
08-003-SEG	Research facility for organometallic chemistry, catalyst development and new material synthesis	Dr. Hayes will use the equipment to develop new ways to create materials with the aim of reducing production costs and unwanted byproducts that may impact the production of materials such as pharmaceuticals, electronics and farm chemicals.	Paul Hayes	University of Lethbridge	$297,802	$89,341	Life Sciences, Energy, ICT
08-004-SEG	Molecular Mechanisms of Small Ribonucleoproteins	New research infrastructure addresses the function and structure of small ribonucleoproteins, essential cellular complexes consisting of RNAs and proteins. Kothe's multi-disciplinary investigations will provide crucial information on the building principles of cellular machines and the molecular causes of diseases.	Ute Kothe	University of Lethbridge	$329,440	$98,832	Life Sciences
08-005-SEG	An Immunobiology Laboratory for Analysis, Purification, and High Throughput Automated Screening of Immune Cells and their Receptors	Dr. James Stafford will use the grant funds to establish a biological laboratory to study aspects of the fish immune system that help to remove virus-infected cells and tumours. His collaborations with biomedical researchers will help to transfer the research results to investigations of human immunotherapy.	James L. Stafford	University of Alberta	$412,877	$123,863	Life Sciences
08-006-SEG	The regulation of microtubule dynamics and microtubule-based processes in living cells	Dr. Martin Srayko will buy a state-of-the-art microscope and other supporting equipment to get a detailed view of the internal structure and dynamics that control a cell's shape. The research will contribute to the basic understanding of cell division, an important aspect of cancer research.	Martin Srayko	University of Alberta	$866,303	$90,000	Life Sciences

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08-007-SEG	Integrative Genomics in Forest Trees: Scaling from Molecular to Ecophysiological Processes	Genomics technologies can be used in forestry to discover genes that regulate important processes such as wood production, how trees prepare for winter, or how they defend themselves against pests like the mountain pine beetle. Diagnostic genetic markers developed using genomics have applications in tree improvement and ecological monitoring.	Janice Cooke	University of Alberta	$355,726	$106,718	Life Sciences
08-008-SEG	The role of the tumor suppressor protein, RASSF1A, in cancer and inflammation	Dr. Baksh will use the award to purchase specialized equipment to study the molecular mechanisms of inflammation. Dr. Baksh's research could lead to earlier cancer detection and a better understanding of possible genetic links to Crohn's disease.	Shairaz Baksh	University of Alberta	$368,786	$103,256	Life Sciences
08-009-SEG	Non-genetic cell phenotype variability in cell fate commitment and tumor progression	Dr. Huang will purchase equipment to investigate why genetically identical cells within a group of cells behave differently. This research may help to better understand cancer and stem cell behaviour and contribute to the field of regenerative medicine.	Sui Huang	University of Calgary	$785,811	$235,743	Life Sciences
08-010-SEG	The Andrology Research Centre for the study of regulation of sperm function and its contributions to early embryo development	The purpose of this proposal is to develop a world-class Andrology Research Centre for studying the regulation of male fertility with the long-term goal of developing an innovative approach for identifying fertile bulls at their earliest possible age and advancing knowledge relevant for understanding male-factor infertility at an interdisciplinary level.	Jacob Thundathil	University of Calgary	$636,400	$190,920	Life Sciences
08-011-SEG	Alberta Bone and Joint Health Technology Assessment Decision Support Laboratory	Using health technology assessment in a practical iterative framework to inform evidence-based treatment and policy decisions about those suffering with bone and joint conditions. This research will lead to the development of new evidence-based approaches to improve the quality and efficiency of bone and joint care.	Deborah Marshall	University of Calgary	$293,760	$88,128	Life Sciences

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08-012-SEG	CCBN Imaging Centre Upgrade	Dr. Robert Sutherland will purchase specialized equipment to enhance the overall use of the imaging equipment, enabling the CCBN researchers to operate their suite of equipment at a lower cost, improve imaging capabilities, and ensure that this internationally recognized research team remains at the forefront of their field.	Robert J. Sutherland	University of Lethbridge	$523,930	$157,170	Life Sciences
08-013-SEG	*In vivo* imaging laboratory	Dr. Catherine Chan will purchase *in vivo* imaging equipment that can be used for multiple fields of medical research, especially diabetes. The specialized equipment enables the researcher to relate results from a living system to earlier results discovered in tissue culture, making the imaging laboratory a powerful tool for Alberta's diabetes researchers.	Catherine B. Chan	University of Alberta	$360,826	$108,247	Life Sciences
08-015-SEG	The contribution of reactive glia to central neuropathic pain	New equipment to research chronic pain, particularly the neuropathic pain related to multiple sclerosis and spinal cord injuries, at the molecular and cellular levels. Dr. Kerr's lab will offer valuable training experience to graduate students and postdoctoral fellows for Alberta's biotechnology sector.	Bradley Kerr	University of Alberta	$312,100	$93,630	Life Sciences
08-016-SEG	Study of regulatory pathways controlling lipid and cholesterol metabolism in *Drosophila*	Dr. Kirst King-Jones will use the grant to purchase equipment for research in lipid metabolism, which supports human growth, development and health. By using genomic and fluorescent microscopy techniques, he will identify important genes related to metabolic processes, and especially those that are involved in the regulation of fat, sugar and energy.	Kirst King-Jones	University of Alberta	$344,826	$103,448	Life Sciences
08-017-SEG	Thermal-sprayed nanostructured Coatings for Equipment in the Natural Resource Sector	Dr. André McDonald will purchase specialized tools to make and test nanostructured titania coatings on gas pipelines and other mechanical equipment in order to prevent rust damage. He aims to bring the technology to commercialization, helping Alberta's oil and gas industry combat corrosion cracking and oil sand slurry wear.	André G. McDonald	University of Alberta	$332,741	$99,822	Life Sciences, Energy, Nanotechnology

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08-019-SEG	Optical instrumentation for the investigation of industrial flows related to oil sand and energy production	Advanced optical instrumentation, tomographic particle image velocimetry (TomoPIV) will be used to investigate flow problems and phenomena related to the production of oil sand. This measurement system combined with a unique flow facility under development will allow fundamental and applied research and will be a one-of-a-kind in the world.	David S. Nobes	University of Alberta	$283,293	$84,989	Energy
08-021-SEG	Scientific Computing Infrastructure for CO2 Injection Enhanced Oil Recovery	Dr. Chen will purchase computing infrastructure to allow him to make highly detailed computer simulations of CO2 sequestration and improve the efficiency of oil recovery from reservoirs. Dr. Chen's research will help in the global effort to find solutions to minimize greenhouse gas emissions.	Zhangxing (John) Chen	University of Calgary	$1,171,878	$351,563	Energy
08-022-SEG	Development of a cell biotechnology suite to evaluate functional feeds and their impact on animal immunity and health	Dr. Barreda will use the award to purchase the tools he needs to test various fractions of Alberta crops, including barley, for their positive impact on livestock health. His research offers the potential for Alberta's agricultural sector to find added value from the crops they produce.	Daniel R. Barreda	University of Alberta	$420,537	$126,161	Life Sciences
08-023-SEG	New Imaging Technologies to Study Immune Receptors at the Single Molecule Level	The new research focuses on gaining a better understanding of our immune system's ability to protect us against fungal infections. Dr. Touret's research may lead to strategies that prevent fungal infections, and his techniques and the new equipment offer an excellent research and training opportunity in advanced imaging techniques for his colleagues and students.	Nicolas Touret	University of Alberta	$919,175	$225,720	Life Sciences
08-024-SEG	Low Background Counting Facility at the University of Alberta	Dr. Krauss will purchase equipment for research in the area of astroparticle physics. He will build unique and highly sensitive detectors which will improve the search for dark matter, a search that is an international effort. Dr. Krauss's research contributions are of high international significance and build upon Canada's recognized strengths in the field of astroparticle physics.	Carsten Krauss	University of Alberta	$200,000	$60,000	Other

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08-025-SEG	Comprehensive multi-dimensional gas chromatography - time-of-flight mass spectrometry facility for advanced research in gas-phase separation science	Dr. Harynuk will purchase specialized equipment that allows him to measure small amounts of compounds in samples that would otherwise be difficult to measure using conventional methods. His research and expertise in analytical chemistry can be applied to many areas, including analysis and new techniques related to tailings mixtures from the oil and gas industry, agricultural products, and health research.	James Harynuk	University of Alberta	$377,065	$90,000	Life Sciences, Energy
08-026-SEG	The integration of development, genetics, and phylogenetics to understand mechanisms underlying diversity of important fruit and floral traits in plants	Dr. Hall will purchase equipment that allows her to investigate and compare the genetic connections between canola, and a related and well-studied plant, Arabidopsis. In particular, she will study the genetic control of flower and fruit development in plants that share the same family as canola, which may lead to the development of better control strategies for early pod shattering. In using a genetic approach, Dr. Hall will introduce important molecular techniques to the next generation of researchers.	Jocelyn Hall	University of Alberta	$301,836	$90,551	Life Sciences
09-001-SEG	Airborne electromagnetic sea ice thickness sensor	Airborne electromagnetic sea ice thickness sensor - Acquiring this equipment will improve the ability to accurately measure and monitor ice thickness changes, providing valuable insight into how sea ice levels may indicate changes in the climate.	Christian Haas	University of Alberta	$401,250	$100,000	Life Sciences, ICT
09-002-SEG	Laboratory for passive seismic imaging of earth processes	Laboratory for passive seismic imaging of earth processes - This award is to develop a laboratory for passive seismic imaging of the earth's processes which will use naturally occurring mini earthquakes as a source of seismic waves instead of artificial methods such as dynamite or air guns. Equipping this laboratory offers the opportunity to advance a wide range of areas including earthquake hazard analysis, CO2 capture and storage, oil recovery efficiency and the earth's physical evolution.	David Eaton	University of Calgary	$808,090	$303,236	Energy, ICT

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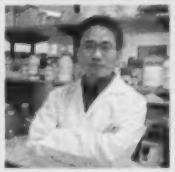
09-004-SEG	A transgenic zebrafish facility to study prion proteins, neurodegenerative disease and photo-receptor regenera-tion	A transgenic zebrafish facility to study prion proteins, neurodegenerative disease and photoreceptor regenera-tion - the award will advance the study of prion function and retinal degenerative disease as Zebrafish share similar genetic material with mammals and are useful models for studying human diseases. Such research will potentially assist in the detection and treatment of BSE, CWD, Creutzfeldt-Jakob disease and retinal degenerative diseases such as macular degeneration.	William Allison	University of Alberta	$206,265	$81,050	Life Sciences
09-005-SEG	Post-translational modifications and the proteome during Apoptosis	Post-translational modifications and the proteome during Apoptosis The funding for purchase of a high definition mass spectrometer system will further the understand-ing of Multiple Myeloma, a form of cancer of the plasma cells. The research aims to generate insight into cancers that appear to be resistant to conventional treatments. This research may lead to the discovery of more effective treatments for these cancers.	Richard Fahlman	University of Alberta	$984,205	$393,682	Life Sciences
09-006-SEG	Development of a comprehensive plat-form for the value-added utilization of poultry products	Development of a comprehensive platform for the value-added utilization of poultry products - The funding to complement the value- added poultry program at the University of Alberta. Some of Dr. Wu's research projects include an egg biorefinery which intends to develop ways to make use of all parts of the egg from the shell to the yolk. A value-added meat program is also incorporated into this award, and will attempt to determine way s to increase the nutritional value of poultry and overall efficiency of the poultry industry. These initiatives will assist in strengthening Alberta's agriculture industry and may develop products which will increase the health of Albertans.	 Jianping Wu	University of Alberta	$341,182	$120,000	Life Sciences

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09-007-SEG	Quantitative photoacoustic imaging technology development	Quantitative photoacoustic imaging technology development - The award will assist in developing a new molecular imaging technology to generate images, such as the amount of oxygen that a body tissue uses, to monitor the development of diseases such as cancer and heart disease, as diseased tissue uses less oxygen than healthy tissue.	Roger Zemp	University of Alberta	$373,981	$135,000	Life Sciences, ICT
09-008-SEG	Obesity Research Laboratory	Obesity Research Laboratory - Equipment purchased will further the study of the role of gastrointestinal signals in regulating food intake, which aims to better understand the complex nature of obesity and the physiological mechanisms that play a key role in obesity in both humans and animals. Dr. Chelikani's laboratory will be a powerful tool in designing future programs for the treatment and prevention of obesity.	Prasanth Chelikani	University of Calgary	$1,140,695	$456,278	Life Sciences
09-009-SEG	Functional Genomics Laboratory for deciphering gene-regulatory and genetic-interaction networks	Functional Genomics Laboratory for deciphering gene-regulatory and genetic-interaction networks - This award will help equip a laboratory for functional genomics which includes an SGA (synthetic genetic array) suite and a microarray suite. With these tools, Dr. Chua aims to uncover and better understand the genetic origin of many human diseases.	Gordon Chua	University of Calgary	$1,186,860	$474,745	Life Sciences
09-010-SEG	A microbiological culture and biochemistry laboratory for carbohydrate research	A microbiological culture and biochemistry laboratory for carbohydrate research - The award supports exploring a novel approach to the treatment of cancer and other infectious diseases that combines the areas of organic chemistry and microbiology. This research has the potential to impact the area of vaccination and the treatment of cancer and infectious diseases through the study of the interaction between carbohydrates and proteins, which plays a role in conditions such as cancer, viruses, autoimmune diseases and inflammation.	Chang-Chun Ling	University of Calgary	$877,460	$350,983	Life Sciences

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09-011-SEG	Laboratory for computational structural biology: Theoretical gateway to molecular origins of selective ligand binding to membrane proteins	Laboratory for computational structural biology: Theoretical gateway to molecular origins of selective ligand binding to membrane proteins - This award will help develop a greater understanding of how proteins on the cell surface or on a membrane within a cell bind to other molecules, which may become a powerful tool for advancing the effectiveness of therapeutic drugs and may provide insight into new methods of drug delivery.	Sergei Noskov	University of Calgary	$756,419	$194,352	Life Sciences
09-012-SEG	Mass spectrometry for elucidation of glycan structure and post translation modification of proteins in glycobiology	This award will be used to purchase a specialized mass spectrometer to boost capability to investigate the chemical biology of carbohydrates. This new equipment will also be made available to other researchers interested in glycobiology. The aim is to broaden the basic understanding of glycobiology, as well as to develop carbohydrate-based vaccines and therapeutics.	David Bundle	University of Alberta	$973,162	$369,776	Life Sciences, Other
09-013-SEG	Bioenergy and the uncultured microbial majority	This award will help establish a new environmental microbiology laboratory at the University of Calgary to further the understanding of how microbial species and novel biotechnological applications of bacteria might advance the use of microbial activity for important environmental and industrial needs.	Peter Dunfield	University of Calgary	$834,328	$329,393	Energy, Life Sciences
09-015-SEG	Harnessing leading edge technology for osteoarthritis therapeutics; unprecedented resolution of cartilage cell signaling and macromolecular interaction with synovial fluid	Many Canadians suffer from osteoarthritis, a disease characterized by the wearing away of cartilage and a decrease in the amount of protective synovial fluid in the joint. This award will support the purchase of a highly sensitive confocal microscope that allows researchers to observe live cells and molecules for longer periods of time compared to earlier confocal technology. The equipment will be used to investigate potential new treatments for osteoarthritis and the research will contribute to providing a long term solution for people living with osteoarthritis.	Wayne Giles Andrea Clark Tannin Schmidt	University of Calgary	$1,283,400	$513,360	Life Sciences

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09-017-SEG	Microfocus X-ray Diffractometer	The grant will modernize equipment to improve the quality of x-ray data collected at the University of Calgary. The research is focused on the development of potential antiviral medications and treatment options for norovirus gastroenteritis and similar diseases.	Kenneth Ng	University of Calgary	$722,019	$288,808	Energy, Life Sciences
09-019-SEG	Nano/micro-encapsulation of nutraceuticals and bioactives for functional foods	Researchers will combine their expertise in nanotechnology and food science in order to develop new food ingredients with superior properties. The award will support the purchase of equipment to help in the study of using Alberta crops, such as barley and flax, to produce high-value ingredients which deliver nutraceuticals into foods, creating functional food products. The research has the potential to boost the value of Alberta crops, and improve the nutritional value of processed foods.	Marleny Aranda Saldana	University of Alberta	$432,484	$168,700	Life Sciences, Other
09-020-SEG	In vivo evaluation of immune tolerance	The award will help improve the study of autoimmune disorders through further understanding of the role of the thymus in this regulatory process. It is anticipated that this new knowledge will have an impact on the fields of organ transplantation and chronic infections such as Hepatitis B and C, and HIV.	Troy Baldwin	University of Alberta	$150,700	$60,280	Life Sciences
09-021-SEG	Molecular Signatures Platform to Characterize Aggressive and Indolent Prostate Cancer	The projectl aims at identifying biomarkers for aggressive prostate cancer that could be implemented clinically prior to treatment. Researchers will investigate the most promising genes and their secreted proteins as tissue and serum biomarkers using automated high-throughput tissue and proteomics scanning systems.	Tarek Bismar	University of Calgary	$160,001	$64,000	Life Sciences
09-022-SEG	From the microcirculation to whole-body function: laboratories to investigate the effects of aging and physical activity on vascular control and functional capacity	This award will assist in establishing a laboratory designed to further understand the relationships between aging and physical activity on blood vessel regulation and will explore physical activity as a treatment option to slow down or reverse the degradation of arterial blood vessels.	Darren DeLorey	University of Alberta	$435,052	$174,000	Life Sciences

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09-023-SEG	Laboratory for the development and in situ characterization of complex solid/liquid interfaces: from biomimetic materials to greener catalysts	The award will be used towards equipment to investigate the bonding of small molecules or ions in solution to surfaces and has the potential to impact many areas, including antibiotic resistance and the development of new catalysts for the energy and ICT sectors.	Julianne Gibbs-Davis	University of Alberta	$652,600	$240,000	Life Sciences, Other
09-024-SEG	Infrastructure for the air quality characterization and control research laboratory	Dr. Hashisho aims to develop new technologies and materials to better control air quality. One particular area of concern is the emission of volatile organic compounds (VOC's) which pose serious health and environmental implications. VOC's are emitted from sources such as paints, furniture, flooring materials, perfumes, and petrochemical-based materials. The infrastructure purchased will assist Dr. Hashisho in creating new, cost-effective ways of controlling these emissions.	Zaher Hashisho	University of Alberta	$361,801	$125,000	Energy, Life Sciences, Other
09-025-SEG	Structural and functional study of membrane proteins in disease	This award will help develop a modern membrane protein expression, purification, and crystallization facility with equipment capable of investigating how the functions of membrane proteins contribute to diseases such as Type 2 Diabetes, blindness, and Alzheimer's. The findings from preliminary research may lead to further developments in novel treatment options for these diseases.	Joanne Lemieux	University of Alberta	$569,641	$227,856	Life Sciences
09-026-SEG	Establishment of a facility to study carcinogen metabolism and transmembrane transport	The award will help further investigate cellular metabolism, focusing on the transport of carcinogens across cell membranes. The research will study arsenic and tobacco smoke, two major contributors to cancer, and aims to develop new treatment options for the disease.	Elaine Leslie	University of Alberta	$614,072	$210,000	Life Sciences

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09-027-SEG	Bacterial biofilm cultivation and imaging with confocal microscopy	This award will help develop a greater understanding of how proteins on the cell surface or on a membrane within a cell bind to other molecules, which may become a powerful tool for advancing the effectiveness of therapeutic drugs and may provide insight into new methods of drug delivery.	Shawn Lewenza	University of Calgary	$483,306	$193,322	Life Sciences
09-028-SEG	Molecular analysis of the host-pathogen interface	The award will establish a state-of-the-art molecular pathogenesis laboratory, which will support research aimed at developing alternative treatment strategies to fight bacterial infections. The researcher's approach is to identify compounds that interfere with the molecular interactions at the interface between bacterial pathogens and their hosts.	Stefan Pukatzki	University of Alberta	$444,680	$177,872	Life Sciences
09-029-SEG	Tools for Modeling DNA Damage and Repair	The award will purchase computer resources for the research program at the University of Lethbridge. By using computer modelling, Dr. Wetmore investigates how our DNA is damaged by carcinogens and how our bodies use enzymes to repair this damage. The DNA modelling aspect of Dr. Wetmore's research has the potential to be used for the design of new molecules to combat diseases such as cancer.	Stacey Wetmore	University of Lethbridge	$353,107	$122,087	Life Sciences
09-030-SEG	Memory networks: ensemble recording, functional imaging, and neurocomputational studies on the biology of memory	Dr. McNaughton's highly innovative research aims to understand the biological mechanisms underlying higher brain function, bringing brain science to a more complete understanding of normal brain function. The results of Dr. McNaughton's research may help us to develop better treatments for brain-related disorders such as Parkinson's disease, fetal alcohol syndrome, brain trauma, stroke, and substance abuse.	Bruce McNaughton	University of Lethbridge	$1,277,759	$426,748	Life Sciences

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09-031-SEG	Bioengineering Technologies for the Clinical Application of Stem Cells	The award will be used to develop a reliable, efficient and safe method to scale-up the production of specialized stem cells, which could become important in the treatment of Parkinson's and Huntington's diseases. With this equipment, Dr. Behie's team will also have the ability to characterize other types of stem cells, potentially leading to new treatments for diseases such as diabetes, arthritis, and heart disease.	Leo Behie	University of Calgary	$704,081	$200,000	Life Sciences
09-032-SEG	High Power Micro-Computed Tomography (CT) at the University of Calgary	The award will purchase imaging equipment that enhances the capacity at the University of Calgary to do high powered scanning of bone and fossil material. It will become the highest-powered CT scanner at the institution and will be used by the researchers for their program in comparative bone and joint biology.	Jason Anderson	University of Calgary	$601,524	$240,609	Life Sciences
09-034-SEG	Multi-Touch Displays for Interactive Information Visualization	The award will purchase equipment that will enhance research capacity in software development for multi-touch digital displays. The software for this new type of display, called massively multi-touch (MMT), encourages collaborative, visual and interactive access to data.	Sheelagh Carpendale	University of Calgary	$468,690	$182,537	ICT
09-036-SEG	Structural Mass Spectrometry for Developing Therapeutics	The award will support the purchase of a specialized mass spectrometer to develop new imaging technology, advancing our understanding of highly complex protein interactions. With this new capacity, Dr. Schriemer and his team will be able to make important research contributions to the development of antibacterial vaccines and therapies for breast cancer.	David Schriemer	University of Calgary	$1,580,174	$579,912	Life Sciences

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09-037-SEG	Exploring the Molecular Basis of Transcriptional Control Inside Living Embryos	The award will support the purchase of potentially transformative light microscopy equipment that will allow the researchers to observe single genes being transcribed within a cell or individual proteins interacting with each other. Dr. McGhee will use this demonstration technology to observe and study the transcription of genes in the nematode animal model, which will aid in our understanding of the human digestive tract.	James McGhee	University of Calgary	$1,964,914	$785,966	Life Sciences
09-039-SEG	A laser scanning facility for rapid three-dimensional measurement	The award will purchase laser scanning equipment of importance to both geomatics engineering and bioengineering. The research program will specifically focus on potential applications to the analysis of the structural integrity of infrastructure such as bridges, the detection and diagnosis of scoliosis, and the application of surveying and mapping services to private industry and government.	Derek Lichti	University of Calgary	$354,117	$139,523	Life Sciences, Energy, and ICT
09-041-SEG	Infrastructure to support the environmental risk assessment of novel transgenic crops	The award will purchase equipment for this research program that will assess the environmental risk of new crops. One of these crops is a specialized canola which uses nitrogen much more efficiently than the canola that is currently available on the market. The researchers will thereby contribute to the important testing process, which will ensure the biosafety of these new crops.	Linda Hall	University of Alberta	$650,100	$259,860	Life Sciences
09-042-SEG	Microfluidics Platform for Transport Processes in Porous Media related to Energy Sector	This award will purchase equipment to enhance research on the interactions between water, oil, and rock at a micro-scale (microfluidics) that occur in porous material, such as the oilsands reservoirs. Dr. Mitra's research has the potential to create new opportunities for Alberta companies involved in the energy sector by reducing the amount of energy and water needed for oil exploration activities.	Sushanta Mitra	University of Alberta	$289,816	$89,575	Energy

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09-044-SEG	Infrastructure for Deployment and Maintenance Environmental Wireless Sensor Networks	This award will purchase equipment to further develop and test the deployment of wireless sensor networks on the landscape. The equipment is essential to the team's aim to increase the sensitivity of the technology for detecting remote signals. The fully developed technology could be used for avalanche detection, environmental monitoring, forest fire management, and other related applications.	Sebastian Magierowski	University of Calgary	$343,955	$127,027	ICT
09-045-SEG	Functional Inorganic Polymers: New Hydrogen Storage Materials and Precursors to Chemically Resistant and Insulating Nanomaterials	This award will purchase equipment to launch this research program in polymer chemistry and nanoscience. One of the research goals is to develop new methods to safely store hydrogen for use in fuel cells. The new equipment is essential for his team to build novel hydrogen storage devices and will complement the facilities already available in the University of Alberta's Alberta Centre for Surface Engineering and Science.	Eric Rivard	University of Alberta	$298,040	$96,400	Energy
09-046-SEG	Advanced Microwave to Millimeter-wave MEMS and CMOS System Development	Drs. Daneshmand and Moez will combine their expertise in radio frequency devices and integrated circuits and systems to develop new microwave devices and test their functionality and limitations. The new devices can be used to improve the speed of data communications and lower the cost of communication products.	Mojgan Daneshmand	University of Alberta	$543,950	$217,580	ICT and Life Sciences
09-047-SEG	A laboratory to study novel aspects of Neurofibromatosis Type 2 regulation	The award will purchase equipment to study genes that have the potential to regulate Neurofibromatosis Type 2 (nervous system tumours). The disorder affects hundreds of patients in Alberta and the current treatment approach, surgery, does not cure the patient of the disease. Dr. Hughes is investigating a new approach to understand why the disease occurs and how to use this understanding to regulate the growth of the tumour.	Sarah Hughes	University of Alberta	$347,248	$138,899	Life Sciences

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09-048-SEG	Instrumentation for Nano-particle Research	Dr. Olfert will use the award to purchase equipment to understand how particulate matter emissions affect climate, the environment, air quality, and human health. One of the aims of Dr. Olfert's research is to help inform policy decisions regarding particulate matter emissions. Another aspect of his research is to identify particulate matter from its source and try to reduce its release into the atmosphere.	Jason Olfert	University of Alberta	$287,781	$101,335	Life Sciences, Energy
10-002-SEG	A Scaleable Optical Sensor Network for Ecosystem Health	Equipment purchased will be used to implement a network of optical monitoring and remote sensing devices to detect changes in ecosystems, such as forests, cropland, or rangeland. The project will gather extensive and integrated environmental data in a cost-effective way, while providing essential information for the sustainable management of Alberta's resources.	John Gamon	University of Alberta	$266,703	$100,000	LS, Energy
10-003-SEG	Infrastructure for Understanding the Molecular Basis and Treatment of Cardiac Arrhythmias	The award supports cardiovascular research and the development of new anti-arrhythmic drugs, which would help regulate abnormal heart rhythms. The research will provide fundamental knowledge necessary for developing new, cost-efficient, and more effective therapies for the treatment and prevention of cardiac arrhythmia and sudden death.	S.R. Wayne Chen	University of Calgary	$988,797	$395,519	Life Sciences
10-004-SEG	Ultraperformance Liquid Chromatography - Mass Spectrometry Facility for Plant Bioproducts Analysis	The award will purchase equipment to bolster research in plant metabolism. The equipment will enable the researchers to reliably identify and measure important compounds made by plants that could have applications in pharmaceuticals, flavours, fragrances, insecticides, and other chemical formulations.	Peter Facchini	University of Calgary	$1,076,348	$430,540	Life Sciences

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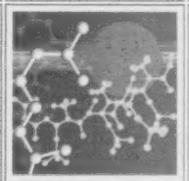
10-005-SEG	Advanced Laboratory for Ubiquitous Sensor Network	Equipment purchased with this award will be used to establish a network of self-sustaining (autonomous) sensors to monitor various environments, including agricultural areas and oil and gas fields. The equipment and research will also provide valuable training opportunities to students interested in developing wireless sensor network technology and data analysis skills.	Henry Leung	University of Calgary	$980,825	$392,331	ICT
10-009-SEG	Molecular Enzymology Laboratory	Equipment purchased will further the study of enzyme kinetics, and the effects of drugs on enzyme behaviour, research that has implications for a basic understanding of enzymes, and for pharmaceutical applications such as understanding drug metabolism. A better understanding of the interaction of drugs with these enzymes may lead to new treatments for Parkinson's disease and to new therapeutic anti-smoking strategies.	Andrew Holt	University of Alberta	$300,801	$120,321	Life Sciences
10-010-SEG	Platelet-Angiogenesis Research Infrastructure for Development of Novel Angiogenesis Regulating PharmaceuticaLife Sciences	The equipment purchased with this award will support research into cardiovascular disease and cancer in Alberta. Dr. Jurasz aims to better understand the role of blood platelets in regulating the formation of new blood vessels, and investigate their potential to be used as part of a new treatment for damaged tissue from heart disease or cancer.	Paul Jurasz	University of Alberta	$493,171	$197,275	Life Sciences
10-011-SEG	In Vivo Cellular Imaging of Brain Structure and Function in ModeLife Sciences of Neurological and Neuropsychiatric Disease	The award will support the purchase of imaging equipment, including an in vivo multiphoton imaging system that allows researchers to see live, real-time, and high resolution views of cells, specifically neurons and glia. The research supported by this award may lead to improved stroke therapy.	Ian Winship	University of Alberta	$999,810	$399,924	Life Sciences

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
10-013-SEG	An Analysis Suite for Characterizing of Smart Polymer/ Nanoparticle Composites	The award will purchase specialized equipment, including a differential photocalorimeter and an infrared camera which will be used to study smart polymer/nanoparticle composites. These materials undergo changes when they are exposed to different stimulus like a magnetic field or light. The research will characterize the new materials to better predict and manipulate their unique behaviour, with the long term aim of developing them for biomedical applications.	Anastasia Elias	University of Alberta	$192,259	$76,903	Life Sciences, nanotechnology
10-014-SEG	Infrastructure for Synthesis of MateriaLife Sciences for Alternative Energy Applications	The equipment supported by this award will be used to investigate lower cost manufacturing processes for commercial carbon nanotube composites. The award also supports a demonstration facility for friction stir welding, a new and highly efficient welding technique for joining high strength steels, which reduces metal fatigue, wear, and oxidation compared to traditional methods.	Adrian Gerlich	University of Alberta	$384,007	$140,000	Energy, nanotechnology
10-015-SEG	Biodiversity Science and Conservation Ecology Group	The award will support the purchase of essential computing and field equipment for use in biodiversity conservation and wildlife management research. The research aims to develop tools for better regional conservation planning and improved sustainable forestry management practices, with the long term goal of protecting biodiversity in Alberta.	Scott Nielsen	University of Alberta	$336,830	$115,489	Life Sciences
10-016-SEG	Petroleum Microbiology Research Laboratory	Equipment purchased with this award will be used to understand the science of anaerobic (oxygenless) petroleum biodegradation. A better understanding of anaerobic hydrocarbon metabolism could lead to improved tailings pond reclamation, increased methane production from marginal reservoirs, and more effective natural environmental reclamation.	Lisa Gieg	University of Calgary	$482,559	$193,024	Energy, Life Sciences

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
10-018-SEG	Infrastructure for Investigation of Organic Nitrates and Reactive Halogens in Laboratory Experiments and in Ambient Air	Dr. Osthoff's atmospheric science research will improve our understanding of pathways that lead to formation of secondary pollutants such as ozone and airborne particulate matter that affect people's health and climate. The atmospheric chemistry research equipment will allow more accurate impact assessments of emissions, and provide scientific instrumentation that presently does not exist in Canada.	Hans Osthoff	University of Calgary	$948,998	$339,691	Energy
10-019-SEG	Cell and Molecular Biology Suites for Studying Reproductive Development in Canola and Arabidopsis	The research equipment purchased with this award will allow Dr. Samuel to uncover novel genetic switches that control canola plant reproduction. Identification and manipulation of these novel genes will directly impact canola crop-yield. The infrastructure funds will build cell and molecular biology suites in the Department of Biological Sciences at the University of Calgary.	Marcus Samuel	University of Calgary	$973,538	$280,000	Life Sciences
10-020-SEG	Establishment of a Molecular Parasitology Laboratory	Drug resistance in parasites is an important economic and animal welfare problem for livestock agriculture and a major global human health problem. The proposed infrastructure will be used to investigate molecular mechanisms of drug resistance and apply the knowledge to improved diagnostics and control.	John Gilleard	University of Calgary	$544,505	$212,427	Life Sciences
10-021-SEG	Germ Line Stem Cell Research Facility	Advances in germ line stem cell research affect biomedical research through generation of animal models and tissue regeneration, agricultural research through improved reproduclive efficiency and dissemination of superior livestock genetics, and animal conservation through preservation of genetic material from rare and endangered animals.	Ina Dobrinski	University of Calgary	$605,131	$240,938	Life Sciences
10-024-SEG	Environmental Impact of Prion Diseases	Prion diseases have had an enormous economic and social impact. Of particular importance to Alberta are bovine spongiform encephalopathy (cattle) and chronic wasting disease (deer, moose, elk). This application emphasizes the environmental impact of prion diseases, focusing on the binding of prions to soil, an interaction that enhances infectivity.	 Judd Aiken	University of Alberta	$932,206	$340,000	Life Sciences

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
10-025-SEG	Research Facility for the Characterization of Nano-based Biomaterials for Gene Delivery Applications	My research program is focused towards the design of cationic glycopolymers and glyconanoparticles for gene delivery applications. The acquisition of the following infrastructure, widefield microscope, zeta potential analyzer and differential scanning calorimeter/ thermogravimetric analyzer, will strongly enhance our research capabilities and hence we expect to make significant progress in this highly innovative field of carbohydrate-based nanocarriers.	Ravin Narain	University of Alberta	$304, 066	$100,000	Life Sciences, Nanotechnology
10-026-SEG	Establishment of Novel Integrated Xenopus Oocyte Heterologous Expression Technologies for the Study of Nucleoside and Other Membrane Transporter Proteins.	Discovered in the YOUNG laboratory, this molecular study of how CNT and ENT proteins move nucleosides across plasma and intracellular membranes will combine the unique versatility/power of heterologous expression in Xenopus oocytes with other technological innovations to improve and expand therapeutic applications of nucleosides in cancer and other diseases.	James D. Young	University of Alberta	$939,858	$340,000	Life Sciences
10-028-SEG	Development of a Prion Agent Preparation Laboratory	This infrastructure will support my prion research laboratory focusing on the pathogenesis of prion agents and the characterization of chronic wasting disease. The research goal is to understand the molecular mechanisms of a prion infection.	Debbie McKenzie	University of Alberta	$208,113	$80,000	Life Sciences
10-029-SEG	Enhancing mining efficiency and decreasing environmental impact using Scanning Probe Microscopy and X-ray Fluorescence Micro-Probe	Efficient and environmentally responsible mineral (coal and oil sands) processing is central to the continuing success of the natura l resource based industry. But there are significant challenges. The industry requires step-out technology to exploit more complex forms of minerals and coal and deal with unpredictable variability of oil sands ores. The cyclical nature of the industry has resulted in a general reduction in training programs. We need to develop a critical mass in world-cl ass mineral research and training.	Zhenghe Xu	University of Alberta	$797,971	$313,798	Energy, Nanotechnology

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
10-030-SEG	In vivo microscopy and real-time quantitative PCR infrastructure to investigate neurodegenerative disorders.	Diseases affecting the central nervous system are a major cause of death and disability in Alberta and Canada. The establishment of the Neurodegeneration Research Unit at the University of Calgary will provide infrastructure to investigate causes and treatments for these pathologies.	Roger J Thompson Shalina Ousman	University of Calgary	$907,839	$363,136	Life Sciences
10-031-SEG	Infrastructure for the Environmental Surface Research Laboratory	This fund will be used to equip an envlronmental surface research laboratory with state of the art equipment for use in research related to nanoparticles, microbes, and organic pollutants, and their interactions with engineered and natural surfaces.	Yang Liu	University of Alberta	$269,450	$105,000	Energy, Life Sciences, Nanotechnology
10-032-SEG	Laboratory for the Fabrication & Testing of FRET and Plasmon-enhanced Nanostructured Photovoltaic Devices	Improvements in the design and processing of organic semiconductors coupled with advances in nanotechnology render possible medium to high efficiency solar cells at a fraction of the cost of convent.ional silicon-based photovoltaics. The fabrication & testing of such devices is the subject of the proposed research.	Karthik Shankar	University of Alberta	$204,902	$80,000	Energy, Nanotechnology
10-033-SEG	Targeting Signaling Pathways in Heart Failure: Potential for New Therapies	The current one year mortality rate after diagnosis of HF remains disturbingly high at between 25- 40%, not to mention the human toll of patient suffering prior to deaths. Our project will create a state-of-the art and highly specialized system in order to study the key elements of heart failure in experimental models which will be complemented by parallel experiments in human explanted hearts with the ultimate aim to foster our understanding of human heart failure and to create new therapies.	Gavin Y. Oudit	University of Alberta	$905,032	$211,430	Life Sciences

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
10-034-SEG	Laboratory for Polymer Electrolyte Fuel Cell Research	Polymer electrolyte fuel cells (PEFCs) can improve energy efficiency and reduce negative emissions. In order for PEFCs to be commercially viable, their cost has to be reduced and their performance enhanced. Novel microfabrication techniques and computational design will be used to develop bio-inspired flow fields and electrodes for PEFCs that achieve the necessary cost reductions and performance improvement for commercialization.	Marc Secanell	University of Alberta	$211,869	$81,854	Energy, Nanotechnology
10-035-SEG	Molecular mechanisms of PCSK9 and ABCG1 in the maintenance of cholesterol homeostasis	Atherosclerotic heart disease is the number one killer in Canada. The requested infrastructure is critical to the success of my team's research on novel molecular mechanisms in cholesterol homeostasis and atherosclerosis. Our findings will lead to the creation of new therapies to reduce the disease.	Dawei Zhang	University of Alberta	$672,890	$269,158	Life Sciences
10-036-SEG	Infrastructure for studying both the biophysics of infectious prion oligomers and the prion disease pathology they induce.	The infrastructure will be used to: I) isolate and characterize the biophysical properties of infectious prion protein oligomers ; 2) produce 3D reconstruct ions of neurons in mouse brain slice cultures after exposure to prions; and 3) investigate the early stages of prion disease pathogenesis in vitro.	Valerie Sim	University of Alberta	$1,000,000	$400,000	Life Sciences
10-039-SEG	A high pressure chemisorption analyzer for characterization of heterogeneous catalysts under industrial conditions	Funds are requested to purchase equipment for the characterization of heterogeneous catalysts under industrial conditions . The equipment consists of a chemisorption analyzer, which is capable of performing temperature programmed reactions, and a mass spectrometer to analyze products.	Vinay Prasad Natalia Semagina	University of Alberta	$323,064	$129,175	Energy, Nanotechnology

Project Number	Project Title	Descriptive Summary	Primary Investigator	Lead Organization	Total Project Cost	SEGP Funds Approved	Key Strategic Area
10-040-SEG	Analysis of the role of genetically defined interneurons in the operation of the locomotor and respiratory CPGs.	The studies proposed in this application will investigate the structure and function of neural networks that underlie simple rhythmic behaviours such as breathing (respiration) and walking (locomotion). The results of these studies will enable us to identify the developmental processes that are essential for the assembly of these neural networks, and allow us to better understand how the respiratory and locomotor behaviours are initiated.	Simon Gosgnach	University of Alberta	$929,302	$371,721	Life Sciences
				TOTAL:	$112,444,520	$37,102,095	

Total Number of Projects - 303	*Total Project Cost*	*Funds Approved*
ASRIP TOTAL:	$794,195,522	$169,188,028
SEGP TOTAL:	$112,444,520	$37,102,095
GRAND TOTAL:	$906,640,042	$206,290,123